Artificial-Intelligence-Related Drivers of Civic Engagement: Social Capital, Trust and Values, and the Mediating Role of Knowledge Sharing

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First I would like to dedicate this to my mother who raised that kid who is proud of having such a mother who teach him how to fight for his dreams, become a doctor I wish you are here, may God bless her soul in the haven, my beloved wife who gives me the strength to be inspired and become an exceptional man in all ways who gives love and kindness to the society. I would like to thank the wonderful human and great supervisor and mentor who stood beside me professionally and provide all the academic and psychological support I ever need all the years of my Ph.D. journey Dr. Oksana Gerwe Brunel University London, I'm proud to say that you are my role model.

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Abstract

Purpose: To assess the relationship between social capital and civic engagement in the absence and presence of knowledge sharing.

Design/methodology/approach: The present research takes a positivist and quantitative approach. It applies an experimental methodology. In order to investigate the research conceptual framework empirically, a survey was pre-tested and post-tested. A chatbot experiment was applied to explore the effect of AI on the respondents' recognition of civic engagement. The chatbot experiment was placed in between the pre and the post tests and it was applied on the sample of the research. The survey was given to a sample of 385 university students and staff members. The returned questionnaires were (68.3%).

Findings: The data analysis process guided the researcher to conclude that according to the social capital theory there are two significant components of social capital which are bridging and bonding social capital. In the context of AI, social media is a perfect representation of social capital, as it has many effects on the processes of engagement in the community. In addition, the models of social capital theory are broadly employed in the research in terms of knowledge sharing and social behavior. However, a combination of social capital and social exchange theories should be used to better recognize the integration of knowledge sharing and social media. Further to that the theories in the available related literature are not sufficient to understand the relationship between social capital and civic engagement, in the presence and absence of knowledge sharing, in an environment characterized by AI.

Contributions and implications:

The current thesis makes four main theoretical contributions:

The first contribution assumes that AI can be used to examine the social sciences; especially, to evaluate how knowledge sharing with the help of social science can be effective if used along with technology to improve the society in many ways.

The second contribution assumes that technology can be used to develop social capital; especially when technology is integrated. this means that integrating AI into social capital can positively change social capital positively.

The third contribution in assumes that civic engagement when integrating AI into civic engagement as in the experiment, civic engagement shows compliance with AI. This means the willingness to use AI was increased, this also means there is more trust in AI. AI no is never against the values of the social capital since it can bring prosperity to humanity.

The fourth contribution assumes that knowledge sharing impacts social capital directly. It is vital to use the proper knowledge sharing tools to let the community participate in the process of learning and development of the AI technology and overcome the technology dis-engagement.

The findings of the research are applicable for the civic engagement sector in the Kingdom of Bahrain and the other countries with similar characteristics. The findings of the research can be applied to enhance participation in civic engagement domain. This is because government shows how social media can lead to greater participation through the benefits of knowledge sharing.

The findings of the research can provide incentives for users who are students or citizens to participate in civic engagement practices.

Recommendations:

Future research is required that can correlate social capital and leadership in the government and private sectors in the Kingdom of Bahrain.

An assessment should be made of the relationship between knowledge sharing and quality of performance in different types of organization in Bahrain.

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Chapter One: Introduction

1.1 Introduction and background

The latest developments in the world of technology have affected almost every area of life. Communication has greatly improved with the advent of social media platforms. This means that individuals and organizations have become more able to fulfil their requirements in a very short time. Other improvements stemmed from the introduction of Artificial Intelligence (AI), which is recognized as an intelligence demonstrated by machines, unlike the natural intelligence displayed by humans and animals (Lepenioti, Bousdekis, Apostolou, & Mentzas, 2020). Due to the continual advances made in the AI domain, the relationship between input, processing and output for machines has begun to experience various changes. AI has enabled machines develop their own knowledge, so that they can transform inputs into outputs (Centobelli & Ndou , 2019). As a result, AI can now receive a wider range of inputs for a task, create their own knowledge and generate outputs. Through learning, people are able to improve their knowledge, and, as a result, provide better outputs as they learn. It is obvious that the range of inputs does not change much. However, for any given set of inputs, the outputs created are improved as a result of machine learning.

The definition of AI itself has improved and now represents a technology in which knowledge is captured, shared, carefully developed and transformed into the right format, both in organizations and in the entire community. AI means that people are likely to gain more experience and learning. They tend to contribute to the success of their organizations and the entire community. Their contributions have various aspects, such as in industry, education, social work, etc. (Saleem, Sumbal, & Eric , 2017).

Thus, AI has become a buzzword. It is applied everywhere and in fields from information technology to medicine, the automotive sector, home appliances and others (Sousa,

Pesqueria, & Lemos, 2019). Research conducted into AI indicates that it is social capital which determines who is most influenced by AI (Handfield, Jeong , & Choi, 2017).

Although research has attempted in the last thirty years to explore the relationship between social capital (SC) and information and communication technology (ICT), this research has rarely if ever considered the relationship between artificial intelligence (AI) and SC (Togawa & Inaba, 2020). There have been numerous definitions of social capital. The most accepted definition considers it to be "trust, norms of reciprocity, and networks with externalities through human minds". Since externalities can be negative, this definition includes the negative aspects of SC as well as the positive ones. There are four types of SC: networks (structural SC); trust and norms (cognitive SC); SC that connects people with different backgrounds (bridging SC); and SC that connects people with the same background (bonding SC) (Ishizuka , 2017).

Social capital plays a critical role in making dreams come true. SC can actually be conceptualized at different levels, including the individual and the organizational levels, as well as the inter-organizational and social levels (Kim , et al., 2013). Although there is a reasonable body of literature which addresses the roles played by social capital at all contexts and levels, little has been written about the contribution of knowledge-sharing to the success of social capital. It has been predicted that the major contributor to success in the twenty-first century will not only be knowledge or technical skills. but also, knowledge-sharing abilities (Kuo , et al., 2013). This refers to an individual's ability to learn, acquire and share knowledge through a network or relationships (Aslam, et al., 2014). Such relationships must in turn be developed.

Their development makes a great contribution to the success of the entire social system, from the definitions above, it will be seen that social capital is made up of three components: networks, capacity and objective. These three elements are always interrelated, while each one

is important in the shaping of these defining characteristics (Huang, et al., 2017). Furthermore, bonding SC and bridging SC are major categories of social capital. They contribute to the impact of social capital on knowledge sharing. This is because SC has a direct influence on the perception of AI. Trust and norms of reciprocity in society as a whole, which are both important elements of SC, may alleviate pessimistic views of AI. Networks can either promote or alleviate the formation of pessimistic AI perceptions (Zhong , 2014).

In accordance with the available literature about social capital, the concept can be thought of as being bi-dimensional. The two dimensions of social capital are bridging and bonding social capital (Wen & Wei, 2018). The differences between these two dimensions derives from the nature of the relationships or connections in the community itself. While bonding social capital is observed within a group or community, bridging social capital can be seen between social classes, groups, race, religions or any other significant sociodemographic or socioeconomic features. It is agreed that the distinctions between bonding social capital and bridging social capital can be best identified in terms of the major features of the relationships.

Furthermore, social capital literature pinpoints bonding and bridging as major determinants of social capital. These assumptions mainly demonstrate that bonding and bridging social capital are correlated to civic engagement (Portela, et al., 2012).

Accordingly, it can be assumed that social capital is a durable critical asset. In this asset, resources must be invested in order to make future benefits. Effectively employing social capital in the social structure confers an advantage on the individual and the entire community.

However, social capital is not essentially context-specific, which means that a network established in one context is cannot be transferred to another (Jones & Taylor , 2012). When students in any university produce a network in their academic context, they are more likely to exploit this network when they join the labor market. Such relationships or networks are also likely to support the process of civic engagement.

The commonest types of civic engagement include citizens who can act alone or together in order to protect the community values, as well as making a change or difference which helps the community to work smoothly. The key objective behind civic engagement is to handle public concerns and promote the quality of the community (Harbour, 2016). Some researchers assume that civic engagement is instrumental since it addresses community issues.

Research into civic engagement shows that it involves developing a combination of knowledge, skills, values and motivation that finally creates an obvious difference in the civic life of communities, as well as improving the quality of life in such communities through both political and non-political processes. Civic engagement can thus be understood as the means by which citizens participate in the life of their community, so that they can support and improve the conditions of other people or to help shape their community's future.

Knowledge, as has been observed, is a major component of the civic engagement process. In order to make the best use of knowledge, it must be well managed. Thus, Knowledge Management (KM) becomes a significant component, through which individuals and organisations are more likely to establish a competitive edge (Shaikh, Bhutto, & Maitlo, 2012). The key objective behind managing the knowledge of individuals is not the management of all their knowledge but only of the knowledge that is important for them. They must have the right knowledge in the right place and at the right time (Koohang, Paliszkiewicz, & Goluchowski, 2017).

Knowledge sharing as a component of knowledge management is assumed to be the most significant factor in making people or organisations as successful as possible. The core of knowledge sharing is the process through which the knowledge, skills, and experiences of employees are shared between them. This process sheds light on the fact that the knowledge of an individual or organisation is available whenever it is required (Yeo & Dopson, 2017). The benefits of this knowledge sharing are the retention of intellectual assets and improvements in

productivity. Previous studies have identified three elements that have a critical impact on knowledge sharing: a knowledge-sharing culture, employee motivation and information technology (Nazim & Mukherjee, 2016).

Information technology is probably the element of knowledge sharing that has been most affected by the introduction of the internet and the development of social media platforms over the past few years. The second decade of the twenty-first century has witnessed substantial growth in the use of social media platforms. Social-media-based applications and platforms have discovered their niche markets – a trend which is ever increasing (Mladenović, et al., 2018). This has affected all the basic functions of every company, and continues to do so. One of these functions is knowledge management. As one of the most important components of KM, knowledge sharing has also been affected by social media platforms (which represent social capital in the era of AI), as knowledge sharing is the act of making knowledge available to others. Therefore, it can be made available easily, quickly and cheaply through online social media (Okazaki, et al., 2017).

The core of knowledge-sharing process is that it is a voluntary, conscious process, which takes place between two or more individuals and leads to joint ownership of the knowledge by both the sender and the receiver (Vuori & Okkonen, 2012a.). Some organizations use social media platforms as instruments for KM, to help increase knowledge sharing and support productivity (Oostervink, et al., 2016).

Thus, in the context of AI, decisions are easily made through social media platforms (using social capital), where knowledge is shared easily. Those with social capital and relationships on social media platforms are able to find online platforms which make their gatherings more accessible from the comfort of their homes, enabling them to make decisions which are necessary for civic engagement.

1.2 Statement of the research problem

The existing literature on the relationship between social capital and civic engagement, with the mediating role of knowledge sharing in the context of artificial intelligence, needs more improvement and support. There is a small amount of this literature, which means that more work is required. This is the theoretical part of the problem that forms the basis of the current research. In addition, there is a related empirical section derived from the researcher's analysis of the experimental results, that there is little recognition of civic engagement by social capital groups and networks in the Bahraini community. This can be attributed to the absence of knowledge sharing between the two variables. The major problem to be investigated in this research can be stated as follows: **"Does social capital have a significant and positive impact on civic engagement mediated by knowledge sharing?"**

Figure 1.1. The relationship between the research variables included in the statement of the research problem

1.3 Research aim and objectives

Research Aim: To contribute to the understanding of the relationship between social capital and civic engagement in both the absence and the presence of knowledge sharing**.**

The following objectives will be enabling the aim to be achieved:

1. To study the concepts and representations of social capital, knowledge sharing and civic engagement, through the literature review and its relationship with civic engagement.

2. To identify the relationship between social capital and civic engagement by studying the relevant concepts, models and theories.
3. To develop a theoretical framework and an appropriate methodology in order to answer the research questions set for this research.
4. To formulate the necessary hypotheses and verify them, in order to answer the research questions and to determine whether the aim and objectives have been achieved.

1.4. Research questions

RQ1: *To what extent are bonding and bridging social capital associated with social media?*

RQ2: *To what extent can knowledge sharing mediate the relationship between social capital and civic engagement?*

RQ3*: To what extent is social capital in terms of trust associated with civic engagement?*

RQ4*: To what extent is social capital in terms of values associated with civic engagement?*

1.5 Thesis Outline

- **Chapter 1: Introduction**

The first chapter mainly aims to provide the audience with a simple introduction that reflects all the variables of the research. It focuses on social capital (social media), knowledge sharing and civic engagement. The problem of the research is stated; the objectives and the questions are provided; and the research hypotheses are formed.

- **Chapter 2: Literature Review**

The second chapter provides a comprehensive review of the available literature about the research variables. The variables are presented in accordance with the researcher's recognition of the relationships between them. It begins with civic engagement as the dependent variable. This includes the presentation of the definitions, the variables that impact CE; the components of CV (trust and value); and the relationships between CE and knowledge sharing, values and trust. Then the knowledge sharing is introduced as a mediating variable. The chapter then mainly concentrates on the connections between KS, CE and SC. Next, the independent variable social capital is presented. In addition to the definitions, the chapter focuses on bonding capital and bridging capital and how they affect SC. This is followed by the context of Artificial Intelligence: AI is defined and its relationship with SC, CE, KS is discussed. The relationship between social capital and civic engagement is presented, and the chapter then concludes by showing the gap in research.

- **Chapter 3: Developing the Conceptual Framework**

This chapter develops the research hypotheses through a critique of the literature review. This depends to a large extent on the relationships between the research variables, as discussed in the previous chapter. The chapter begins by explaining the background of the research topic. The researcher then presents the relationships between social media, bonding social capital and bridging social capital. This is followed by an exploration of the impact of social capital on civic engagement. The relationship between social capital and knowledge sharing is then investigated, and the relationship between knowledge sharing and civic engagement is explored. The relationship between trust, values and civic engagement follows, and the chapter then shows the impact of cultural factors on civic engagement. At that point, the theoretical framework is introduced. Finally, the research problem is stated in the light of the review of the variables, identifying a gap in the literature.

- **Chapter 4: Research Methodology – Quantitative non-experimental survey distribution**

The fourth chapter is dedicated to the presentation of the research methodology. This chapter is significant because it explains how the research was conducted. This methodological section is regarded as a bridge between two different sections of the research. It bridges the gap between all the relevant theory and literature and the empirical actions of the research. This can be found between Chapters One and Two, which are derived from the literature, and Chapters Four and Five, which present the empirical data analysis.

- **Chapter 5: Data Analysis**

The statistical program SPSS 22.0 was used to analyze the data collected from the questionnaire. This is the most widely used program for quantitative data analysis. The findings of the program tests are very accurate and provide comprehensive descriptions (Bryman & Cramer, 2011). The tests that were used answered the questions and tested the hypotheses. The questions were answered by the descriptive statistics. The hypotheses were tested by the simple and multiple regression, and the Pearson correlation. Reliability was identified through the Cronbach's alpha test.

- **Chapter 6: Discussion**

Following the empirical findings presented in the previous chapter, this chapter summarizes the knowledge-based contributions of the empirical findings. The relevant literature from Chapter Two is connected with significant areas of the empirical findings, while the literature from Chapter Two that is not supported due to its insignificant findings is also mentioned.

Further literature is reviewed in order to attain deeper theory-led rational explanations of why these relationships are insignificant.

- **Chapter 7: Conclusion**

This chapter summarizes the research undertaken in this study and describes how the aims and objectives of this thesis were achieved. This overview leads to a statement of the research contributions and research innovations of this study. Finally, this chapter presents further literature, describing other research areas that could be integrated with the research area of this study and identifies opportunities for future research.

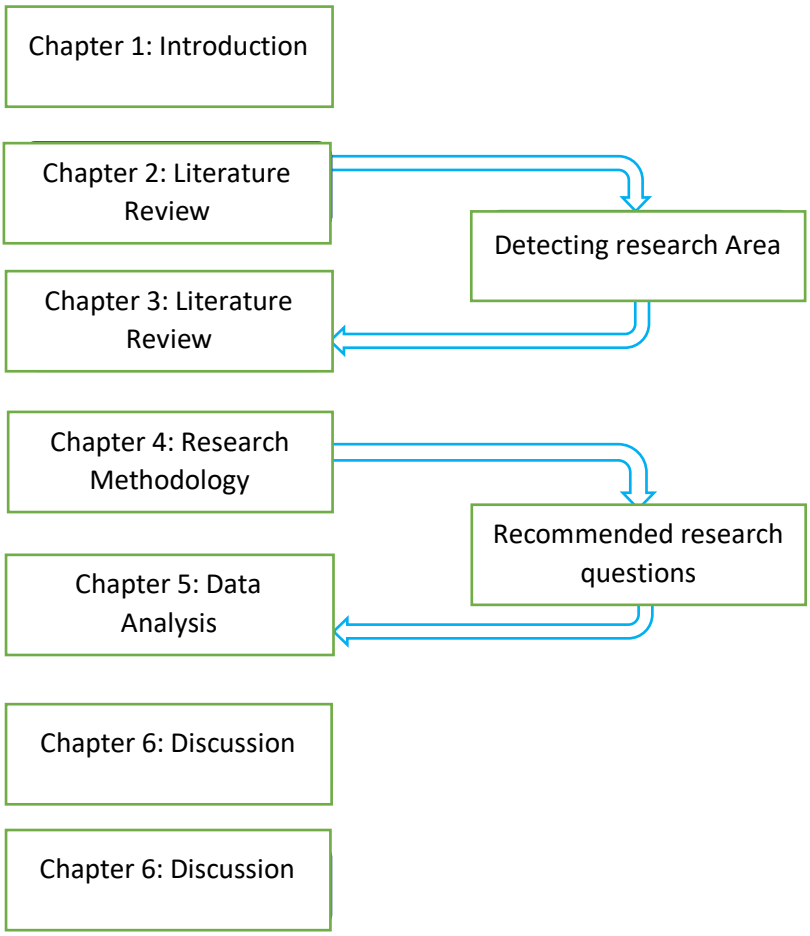


Figure 1.2 Structure of the thesis

Chapter Two: Literature Review

2.1 Introduction

The topics of civic engagement, social capital and knowledge sharing are all of great significance. Numerous research projects have focused on each of them. However, few of these have correlated all three in a single project. The present study attempts to link civic engagement, in terms of trust and values, with social capital, including bonding and bridging capital. This relationship is studied alongside the mediating role played by knowledge sharing. More specifically, the impact of social capital on civic engagement is investigated in the absence and presence of knowledge sharing, in the context of artificial intelligence.

There is no doubt that investigating this relationship requires the researcher to examine each variable separately from the perspectives of other researchers who have focused on these variables in prior research. The present study attempts to answer **four** questions that will enable the aim and the objectives of the study to be fulfilled. The first question seeks to determine the extent to which bonding and binding capital can be associated with social media. The second aims to establish how far social capital can be associated with civic engagement. The third attempts to determine the extent to which knowledge sharing can mediate the relationship between social capital and civic engagement. The fourth and final question seeks to show how far trust and value can be associated with civic engagement. In addition to these questions, there are some other objectives. The key objective for this study is to contribute to an understanding of the relationship between social capital and civic engagement, in the absence and presence of knowledge sharing. Other objectives are derived from this key objective. The first objective is to study the concept of social capital and its representations, with a focus on social media characterized by AI and its relationship with civic engagement, using the literature review. The second objective is to identify factors that affect the relationship between social capital characterized by AI and civic engagement, by studying the relevant concepts, models

and theories. The third objective is to develop a theoretical framework and an appropriate methodology to answer the research questions. The fourth and final objective is to formulate necessary hypotheses, and then verify those hypotheses in order to answer the research questions and determine whether the aim and objectives have been achieved.

The literature review section is intended to present those topics in the existing literature which are relevant to the variables of the present study and show how they are likely to affect each other. This presentation should allow the research to provide readers with sufficient knowledge of the variables. In addition, the literature review section will show whether there is a gap in the available literature concerning the relationships between the variables.

This chapter will introduce the research variables. It will start with the dependent variable, civic engagement, examining the concept of civic engagement; theories of civic engagement; civic engagement and social media; factors affecting civic engagement; and the significance of civic engagement. The components of civic engagement, trust and values, will be a major concern of this section. Then the chapter will concentrate on the mediating variable, Knowledge sharing, which will be presented in terms of its definition and significance. The relationship between knowledge sharing and civic engagement will also be presented. The independent variable, social capital, will then be presented. In this study, social media will be referred to as social capital. The concept of social capital will therefore be defined, the dimensions of social capital will be presented, and the significance of social capital will be illustrated. The factors which affect social capital, and the significance of social capital are also main concerns of this section. The main components of social capital, bonding and bridging capital, will be presented, and there will be a focus on the impact of social capital, bonding and bridging capital on knowledge sharing. Finally, knowledge sharing in the context of artificial intelligence is also a concern of this chapter.

2.2 Civic engagement

Civic engagement is defined as the means through which citizens participate in the life of a community. in order to improve conditions for others or to help shape the community's future (Richard & Gogg, 2005). This concept has previously been used primarily in the context of younger people. However, the past few years, a new movement has emerged which promotes greater civic engagement by older adults.

2.2.1 Definition of civic engagement

The concept of "civic engagement" means "working to make a difference in the civic life of our communities and developing the combination of knowledge, skills, values and motivation to make that difference": in other words, promoting quality of life in a particular community or society through both political and non-political procedures and processes (Ehrlich, 2000).

In addition, civic engagement includes activities which citizens take part in for both personal and public gain. Such activities are both individually enriching and socially useful. Another definition states that civic engagement "is a process in which people take collective action to address issues of public concern" and is totally "instrumental to democracy" (Checkoway & Aldana, 2013).

A report prepared for the Carnegie Corporation confirms that there is a "lack of consensus on what constitutes civic engagement" (Gibson, 2000). While there is not a single universally agreed definition of civic engagement, many scholars associate it with public work or activities that influence public matters (Levine, 2007) . For example, Sanchez (2006) claims that political participation mostly refers to a collection of activities used by citizens to affect government structures, the choice of government officials or government policies. Likewise, civic engagement includes voting in political elections, seen as a social activity (Adler & Goggin, 2005). Some recent studies have started to associate civic engagement with social justice and social work. For example, Pritzker, Springer and McBride (2015) have investigated

a number of civic behaviors of university students, from voting and political engagement to participating in protests and joining social action groups.

In fact, many studies which define civic engagement limit the concept to particular types of activity. The definitions below are broader and more inclusive.

- **Civic engagement as community service** Some definitions of civic engagement focus on participation in voluntary service in the local community. This participation could involve a single individual working independently or being part of a group. In this context, "Civic engagement is an individual's duty to embrace the responsibilities of citizenship with the obligation to actively participate, alone or in concert with others, in volunteer service activities that strengthen the local community" (Diller, 2001).
- **Civic engagement as collective action** While the previous definition states that activities can be for individuals or groups, other definitions restrict the concept of civic engagement to include only activities undertaken collectively or in groups. In this definition, "Civic engagement is any activity where people come together in their role as citizens" (Diller, 2001). Moreover, it is defined as "the means by which an individual, through collective action, influences the larger civil society" (Benshoten, 2001).
- **Civic engagement as political involvement** Other definitions restrict the meaning of the concept to actions and activities which are not only cooperative but also specifically political: "Civic engagement differs from an individual ethic of service in that it directs individual efforts toward collective action in solving problems through our political process" (Diller, 2001).
- **Civic engagement as social change** Crowley (2011) concentrates in his definition on social change as a component of civic engagement. He states that "Civic engagement describes how an active citizen participates in the life of the community in order to help

shape its future. Ultimately, civic engagement has to include the dimensions of social change." (Crowley, 2011).

2.2.2 Civic engagement and social media

Social media has broken through into almost every aspect of our modern life. In particular, social media provides users with the ability to facilitate and enable civic engagement. For example, the sharp decline in political participation, one of the most difficult problems facing democracy in the Western hemisphere, has been partly solved by this effect of social media (Dahlgren, 2009). Social media has proved that it can help reinvigorate political engagement, increasing the level of voting in parliamentary elections, and therefore strengthening democratic responsibility at both the national and international level (Castells, 2013).

The large numbers of social media users have emphasized the presence of new possibilities for self-organizing participation, such as direct democracy, and for the avoidance of mass media gatekeepers, so that users can take direct action to address issues of concern. However, others believe that these accounts have highlighted the supremacy of individualism, commercial interests, non-committal participation and censorship (Uldam, 2014).

For most academics and researchers, social media represent a new and promising arena for civic engagement, especially as young people use it in large numbers, and are the largest segment using the various social media websites (Christensen, 2011). Recent studies and reports show that the rise of movements such as the so-called 'Twitter revolutions' or 'Facebook revolutions' in the Middle East, also known as 'The Arab Spring', and the Occupy Wall Street movement, has been caused by social media, as it played a significant role in mobilizing people to take part in such civic actions (Third, et al., 2020).

In addition, social media provides users with new opportunities for social interaction and active participation via online meet-ups, chat rooms, blogs, video-sharing sites like YouTube, and social networking sites such as Facebook, Instagram, WhatsApp, Twitter,

Tumblr, Linked in and Google+ (Beņķis, 2019). In this way, social media provides users with the ability to become collaborative and() active participants, instead of being passive viewers (Thackery & Hunter , 2010), and so can provide a suitable arena in which enhancing participatory democracy can be improved through enhanced civic engagement. As a result, government bodies, non-profit institutions such as humanitarian organizations and political parties, and industrial enterprises with a social mission are now all investigating such recent social movements with the intention of making use of them. Nowadays, significant efforts are being made by the research community to explore the impact of social media sites like Facebook, Twitter and Myspace on users' social capital and civic engagement (Brandtzæg, et al., 2017).

In terms of the impact of social media upon social capital, Jenkins et al. (2006) describe the participatory culture of such websites as having comparatively low barriers to artistic expression and civic engagement. They provide strong support to individuals, helping them to create and share their work with others. Moreover, informal mentorship by experienced people in specialized fields enables others to benefit from a collective collaboration which enriches social capital. On such online sites, members feel that their contributions matter and have some significance. Additionally, these social media websites enable members to feel some degree of social connection with others who share their interests and concerns (Haller, 2018).

Further academic studies of online discussion have indicated that online conversations moderated by government officials can lead to more respectful behavior from participants than spontaneous, unofficial online conversations. This strengthens the assumption that the future design of civic engagement in social media should enhance and support an informal method, through which users can join intensive conversations in a flexible but respectful fashion (Davies & Chandler , 2012).

2.2.3 Factors affecting civic engagement

Many factors can promote or prevent effective civic engagement, as follows:

Trust Local democracy within the community is not a fundamentally legislative process. However, it considers the different cultural and systemic elements which exist in the community. As a consequence, it is important to think of the existence of mutual relationships between associations and citizens. The legislature cannot exist unless it pays attention to a continuous process of information, discussion and exchanges with individuals. This will create trust from both sides, allowing laws to be implemented. In this sequence, building trust is crucial, and the absence of such trust between authorities and citizens hinders effective civic engagement (Valmorbida ،2014).

Awareness The processes of decentralization within society address the organization of competences, powers and responsibilities. Two main parties participate in this process: institutions and citizens. Both parties need to carry out their own processes of capacity building, development and training. Improvement should include these two integrated parties whether the governance, institutions or civil society. The training of both parties increases the level of civic engagement in the community. Any lack of awareness and understanding in this process could hinder effective civic engagement, representing another challenge for the parties concerned (Chang & Chuang, 2011).

Joint approach Clearly, these two constituents of governance (citizens and public institutions) could never produce development and improvement in parallel paths without meeting and crossing over to each other. There should be collaborative joint processes, where the two develop and cooperate side by side. Such developed capabilities are liable to produce continual discussion between them, in order to achieve the highest engagement in civic actions, benefiting the whole of society. In the main, a perfect legislative system should be built side

by side simultaneously while developing governance and citizenship. Such joint work would guarantee greater civic participation by each citizen (Ehrlich, 2000).

Attitude to participation in social activities is not a gradual, rule-based process. Instead, it derives from an inherent 'attitude' towards participation for the benefit of the whole community. Those involved with schools, universities and organizations should work on making such an attitude deep-rooted in every citizen. Recognition and knowledge of the required skills of cooperation, participation, negotiation, conflict resolution and team building will affect engagement. A positive attitude to engagement as a regular process is normally associated with the cultural elements related to dealing with public policies (Haller, 2018).

Legislative and institutional limitations A community sometimes suffers from legislative and institutional limitations which restrict the activities of civic engagement. These restrictions should be seriously revised and modified, so that civic participation can develop in different social activities such as politics, education and charity work. The presence of such limitations creates a challenge for developing civic engagement (Lee, 2018).

Financial and structural limitations in most countries, the municipalities and local bodies responsible for civic engagement are financially weak, which affects their competence. They only receive funding from central government. Lack of capital represents a challenge, where it is necessary to initiate community activities such as providing a real center for decision-making. In such cases, fruitful dialogue with citizens can be useful, where civil entities can carry out projects for the benefit of the community, relieving the pressure on central government and local authorities (Jans & Karp , 2017).

Lack of transparency and corruption the major factors that impact civic engagement include a lack of transparency and the presence of corruption. Public institutions are heavily affected by corruption which hinders virtuous growth in democratic, social and economic terms. In turn, the presence of such corruption discourages citizens from participation in civic

activities, as they do not know whether their efforts will help the deserving. In addition, transparency encourages citizens to further share in social activities, where their work is openly acknowledged. A lack of transparency and the existence of corruption undoubtedly discourage citizens from participating effectively in civic duties and actions (Singh, 2018).

Lack of role models the feeling of citizenship is made and is not innate. Making citizenship deep-rooted in the souls of citizens requires the collaboration of both government bodies and social ones, including school and home. Religious institutions, teachers and parents should provide good examples of citizenship to their young. Such models teach citizens to follow the news or discuss public affairs, increasing their devotion to public service, and thus raising levels of civic participation in the community (Yang, 2007).

The following figure shows the factors that affect civic engagement:

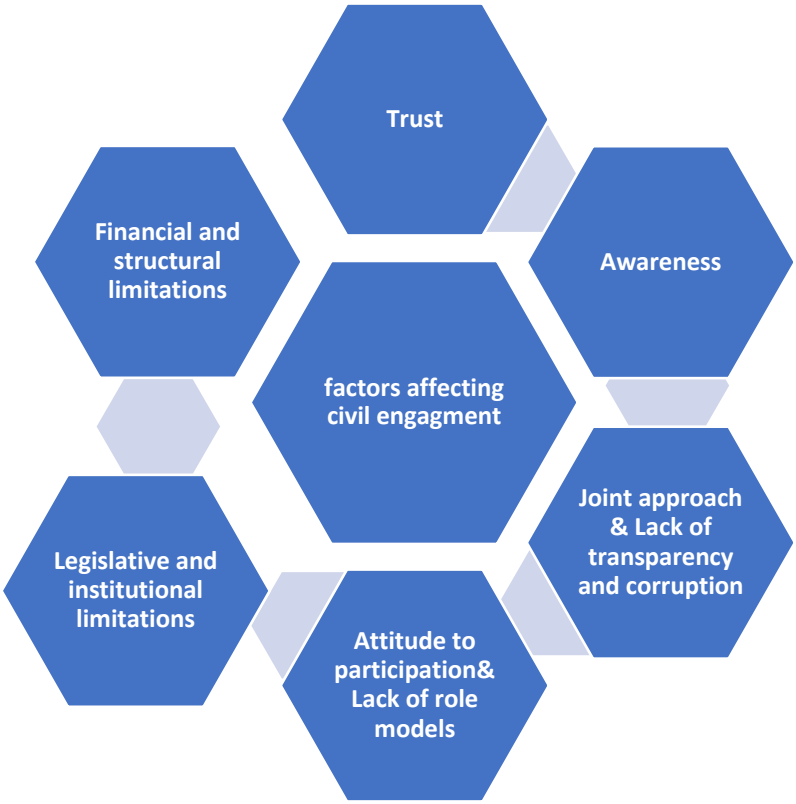


Figure 2.1 factors that affect civic engagement

(Yang, 2007).

2.2.4 Values, trust and civic engagement

It is agreed that civic engagement is a major component of the culture of a community.

However, not all communities are able to practice civic engagement. Only communities with strong cultures are able to practice civic engagement appropriately (Hitlin, 2009). In these cultures, people have specific values that persuade them to engage in civic activities which benefit of the entire community. Values are defined as "standards, which individuals and social groups employ to define personal goals and essentially shape the nature and form of social order in a collective, i.e. what is acceptable and not acceptable, what ought or not to be, what is desirable or non-desirable" (Tsirogianni, 2011). When people in this community are equipped with the desired values, they become ready to sacrifice their time and effort to satisfy the needs of others in the same community through engagement in civic activities. What enhances the relationship between values and civic engagement is that these values constitute principles which are created by the dynamics of the community, the institutions within the society, and the traditions and cultural beliefs of its people (Tsirogianni & Gaskell, 2011). This clearly explains why Eastern communities enjoy particularly effective civic engagement, as their values are stronger and more related to the social institutions of the community.

There is a general recognition that values create strong ties between individuals. These ties are created through trust. Whenever values dominate a community, trust is assumed to exist. As a concept, trust seems to be a rather elusive and multidimensional concept. The concept is not confined to interpersonal trust, but extends to social trust and trust between individuals (Salinas, et al., 2018). Communities are made up of more than individuals; they have their own structures, institutions, and organizations. As a result, society contains the trust of individuals not only in each other (interpersonal trust), but also in institutions and organizations. Such trust facilitates the integration of individuals and institutions to create

better civic engagement (Bonnefon, et al., 2016).This means that both trust and values have a mutual impact on each other, and they both positively and significantly impact civic engagement.

2.3 Knowledge sharing

The term ‘knowledge management’ was coined in the 1980s, and has since become part of the academic and business mainstream. Interest in it has increased rapidly during the last decade and shows no signs of abating. Knowledge management is a multidisciplinary area that combines a wide range of applications, including cognitive science, psychology, information theory, social network analysis and complexity science. Advances in the field of knowledge management have improved innovations, increased performance and expanded knowledge, from both an individual and an organisational perspective. Most business management systems require a considerable amount of attention, resources, time and energy to carry out the various processes, procedures and activities that relate to knowledge management. Integrating knowledge management with artificial or computational intelligence techniques could significantly reduce the amount of work required to manage traditional knowledge management systems (Manogaran, et al., 2020).

2.3.1 Knowledge sharing as a component of knowledge management

Academics and practitioners have shown great interest in the field of knowledge management, as it plays a very important role in enabling individual and organizational success (Inkinen , 2016). The literature contains different definitions of knowledge management. Most of these differences can be explained by identity of the researcher and the nature of their academic discipline. One of these definitions of knowledge management (KM) describes it as “a set of processes aimed at maximizing the outcomes of the knowledge produced within a business unit, a firm, a network of firms” (Filieri, 2010).

Knowledge sharing represents one of the most significant elements of knowledge management (Chong, et al., 2014). Knowledge sharing refers to "the exchange of different types of knowledge between individuals, groups, units, and organizations" (Khalil & Shea, 2012). It is seen as the process of exchanging knowledge within a group or organization (Lilleoere & Hansen, 2011). Additionally, knowledge sharing is "the process of capturing knowledge or moving knowledge from a source unit to a recipient unit" (Bircham-Connolly, et al., 2005).

Previous literature has studied the antecedents, and investigated the consequences, of knowledge sharing within organizations. Wang and Noe (2010) recognized a number of antecedents. These include organizational contexts such as management support, rewards and incentives, organizational structure, and organizational culture and climate. They also include interpersonal aspects such as team features, diversity and processes. There are also cultural characteristics, individual characteristics and motivational factors such as interpersonal trust and justice, as well as individual attitudes. All of these factors affect the process of knowledge sharing (Yeşil & Hırlak, 2018). For example, Cheng et al. (2009) examined the individual, organizational and technological factors influencing readiness to share knowledge. They found that personal expectations and incentive systems are the two most important factors which encourage academics to share knowledge. They also found that "forced" participation is not an effective way of sharing knowledge between academics.

In a second study, Jain et al. (2007) showed that systems of rewards and performance appraisals have a positive impact on knowledge sharing between individual members of academic staff. On the consequences of knowledge sharing, many recent theoretical and empirical studies have indicated that knowledge sharing has numerous implications for individuals (Dee & Leisyte, 2017), teams (Weber, et al., 2011) (Maccurtain, et al., 2018) and organizations (Eidizadeh, et al., 2017). McDermott and O'Dell (2001) showed that there is no

single correct method which will encourage people to share knowledge in organizations; instead, many different methods are effective. They depend on the style and values of the organization. In addition, Van den Hooff and Van Weenen (2004) have distinguished between the two main different forms of knowledge sharing: knowledge donating (i.e. communicating one's personal intellectual capital to others); and knowledge collecting (asking colleagues to share their intellectual capital). They then concluded that the required knowledge can be obtained by combining these two different forms (Kang & Lee, 2017).

2.3.2 Significance of knowledge sharing

Knowledge sharing refers to the exchange of valuable information between the employees of an organisation. It can take the form of manuals, handbooks, mentoring sessions or even informal discussions between workers. Several research papers have concluded that knowledge sharing can lead to more innovation, better performance and greater creativity for individuals, teams and organisations. These papers also claim that an appropriate use of knowledge sharing and Artificial Intelligence (AI) techniques could positively change the future of business management systems. In fact, AI could enable machines to collect knowledge and learn the overall business process using a set of predefined rules and standards without any human intervention. Knowledge sharing could act as a repository in which AI could obtain knowledge and perform data classification. In addition, knowledge sharing could prevent a 'brain drain': long-time employees have accumulated a lot of valuable know-how over the years, but they will take that knowledge with them when they leave unless they document it or share it with other employees. Moreover, with effective implementation of strategies for knowledge sharing, the employees of an organisation are better equipped to do their jobs: when knowledge is not shared, decisions take longer, the same mistakes are made over and over again, work is duplicated and the overall quality of work suffers. Also, when employees have access to the information they need when they need it, they get things done faster. Furthermore, when they

employ strategies for knowledge sharing, new members of staff increase productivity faster. For example, when a new employee joins a team, there is an overwhelming number of things they need to learn, including tools, workflows and company culture (Law & Chang, 2012).

2.3.3 Knowledge sharing and social media (social capital)

In the last few years, social media platforms have attracted greater global attention, because of their pervasiveness and social impact. They have made major changes in the way that people share their knowledge, communicate and cooperate with each other (Filo, et al., 2015). Social media platforms involve a variety of online media: word-of-mouth forums including social networking systems (SNS) such as Myspace and Facebook, personal blogs or microblogs such as Twitter, pictures or video-sharing applications including Flickr and YouTube, and collaborative websites such as Wikipedia (Osatuyi, 2013). These various types of social media platforms represent unique and well-established channels for knowledge sharing. In these channels, people have the chance to find other users with similar concerns and interests, and can share information, thoughts, ideas and opinions with them (Bilgihan, et al., 2016).

Nowadays, the various applications of social media are not just for personal use, Organizations now see them as effective tools for communication and knowledge sharing (Lam, et al., 2016). For example, some organizations, in both the private and public sectors, are investigating the possibility of using social media for knowledge sharing, with the aim of enriching citizen awareness, as well as the actions of government (Dekker & Bekkers, 2015).

Other organizations may use social media as a method of generating knowledge inside different business sectors, and incorporating customers into many different areas of activity (Busalim, 2016).

In the same way, higher education institutions have adopted social media as a method of stimulating learning activities and enhancing the learning process as a whole (Balakrishnan & Gan, 2016). In addition, healthcare organizations have adopted various social media

platforms as effective tools for internal knowledge sharing, facilitating the flow of work-related data and information both within teams and between individual team members (Li, et al., 2016). Since the Haiti earthquake in 2010, social media has also been extensively used in disaster management (Yates & Paquette, 2011).

Overall, the knowledge-sharing applications of social media have considerably changed the way we live, work, learn and interact. Social media websites enable us to experience smooth and non-stop knowledge sharing via the virtual world (Osatuyi, 2013). However, it is clear that research about the use of social media in the field of knowledge sharing is still in its infancy, although this concept has been increasingly developed, and has received increasing levels of attention in recent years (Behringer & Sassenberg, 2015).

The integration of AI in knowledge sharing through social media could provide new scope for improvement. For example, the production by Microsoft of new interpretation robots could facilitate the sharing of knowledge from any language the organization requires. This AI technology could help different departments of modern organizations to modernize their data, skills and knowledge. In addition, this could improve all the economic activities and social life within a community, by enhancing the technologies used for communication and information (Jallow, et al., 2020).

2.4 Social capital

The concept of ‘social capital’ has become one of the most prominent and intensively used in the social sciences today. Although the first use of the term ‘social capital’ dates back to the early 20th century, it did not become a component of wider sociological discourse for some years. The term "social capital" normally refers to the networks, connections or relationships existing between people, in addition to the value arising from them, where this can be accessed or mobilized. This can enable individuals to succeed in their lives. Social capital provides individuals with information, emotional and financial support, and many other resources. The

proliferation of academic research into social capital, following the seminal work of Putnam (1993), has produced an imposing body of work, confirming the significance of social capital in many different areas of development (Abbott & Reilly, 2019).

The available literature on social capital, although limited, indicates that two significant dimensions characterize the concept. These two dimensions are bridging social capital and bonding social capital (Wen & Wei, 2018; Adler & Kwon, 2002). According to Putnam (2000), bridging and bonding are not categories into which social networks can be neatly divided, but they are "'more-or-less' dimensions along which we can compare different forms of social capital". He defines bridging social capital as outward-looking networks and connections among different kinds of people – such as the civil rights movement – whereas bonding social capital is defined as inward-looking networks which bring together similar kinds of people – for example, church-based women's reading groups. Additionally, he claims that bridging social capital spans "diverse social cleavages", whereas bonding social capital strengthens exclusive identities and homogeneous groups.

In addition, Putnam adds that bridging and bonding social capital have diverse consequences and effects. For example, bonding social capital is good at supporting specific reciprocity and mobilizing solidarity. On the other hand, bridging networks are better at linking to external assets and information diffusion. In Putnam's terms, bonding social capital is good for 'getting by', but bridging social capital is crucial for 'getting ahead'. Therefore, according to the existing literature, while bonding social capital is geared towards survival, bridging social capital is oriented to moving ahead, development and growth. The literature indicates that bonding and bridging social capital are both fundamentally derived from social capital theory (Sato, 2013). For instance, bonding social capital is defined as bringing similar individuals together, while bridging social capital indicates bringing individuals together with those who are different from them in terms of race, social class, education, age, religion, gender

or ethnicity (Stout et al. 2012). While the first happens internally within groups, the second is external to a group (Turner, 2011).

In their research into the civic engagement of people in China in the context of genetically modified food, Wen & Wei (2018) claim that social capital is identified by bonding or bridging among the factors integrated in civic engagement. Kapucu (2011) supports this view. In the literature, bonding and bridging have been represented as elements of social capital (e.g. Wen & Wei, 2018; Myeong & Seo, 2016). This confirms that bonding and bridging social capital are associated with civic engagement.

The definitions of both bonding and bridging are also apparently associated with social media. For example, social capital theory suggests that social capital occurs in networks, and bonding and bridging take place in both homogeneous and heterogeneous networks (Kapucu, 2011; Adler & Kwon 2002; Putnam 2000). If this argument is applied to social media, such as ChatBot, it can be seen that people, both within specific groups and moving outside their group, are in networks creating both bonding and bridging. When such bonding and bridging happens through ChatBot, then social capital is created in terms of "access to new sources of knowledge representing an important direct benefit of social capital". However, in real life it is not clear whether every member in the network will be fully bonded to the social capital or will create a bridge to the social capital. Making people bond or bridge to social capital is a challenge and it is therefore necessary to understand to what extent people involved in civic engagement can be bonded or bridged to social capital by AI. If a relationship between bonding and bridging social capital can be identified empirically, then it will be possible to predict to what extent the bonding and bridging take place (Gannon & Roberts, 2020).

2.4.1 History of social capital

Social capital has represented a notable addition to the vocabulary of social science, as statistics show that there are more than 500,000 "hits" on this term in Google (Kadushin, 2004). The

concept of social capital has gained increasing attention, matching even globalization in popularity since the mid of the 1990s, while there has been an immense increase in the quantity of journal articles related to social capital (Schuurman, 2003).

Social capital has become part of economic analysis only recently, although many elements of the concept have been present under different names for a long time. Some authors believe that its origin goes back to the Aristotelian period, where man's behavior was seen as an important force promoting common interests. Since then, a growing number of political scientists, sociologists, economists and organizational theorists have used the concept of social capital in their own research (Menkhoff, et al., 2007).

Within organizations, social capital was previously referred to as "informal organization". This dates back to the Hawthorne Studies, which studied groups of workers and demonstrated their impact of those groups on performance as well as on work norms. The lineage of social capital between organizations is apparently found in Marshall's (1919) debate about industrial districts. Tracing the history of social capital before its official invention shows its relationship with the history of organizational research (Adler & Kwon, 1999).

In the early 1890s, Marshall and Hicks used the term 'social capital' to differentiate between temporary and permanent stocks of physical capital (Woolcock, 1998). In 1916, Hanifan used the term, defining it as "goodwill, fellowship, mutual sympathy and social intercourse among a group of individuals and families who make up a social unit, the rural community, etc. The accumulation of social capital, which may immediately satisfy one's social needs and which may bear a social potentiality sufficient to the substantial improvement of living conditions in the whole society" (Hanifan, 1916).

According to Jacobs (1965), the concept of social capital originally occurred in community studies, stressing the vital significance of the survival and functioning in city neighborhoods of networks of strong, cross-cutting personal relationships created over the

passage of time, providing a basis for collaboration, trust, and cooperative action to exist and flourish in these communities (Menkhoff, et al., 2007).

Over time, social scientists have started to mention various terms in their research, which coincide with the notion of social capital, such as through Granovetter's (1973) "weak ties" and Boissevain's (1974) "friends of friends", which refer to a particular network through which members can obtain advantageous access to data, information and opportunities. Finally, as Bourdieu demonstrated, important social capital in the form of social status or reputation can derive from owning a membership of specific networks, mainly those where such membership is comparatively restricted (Burt, 1992).

This historical review of the concept of social capital indicates that many factors have interacted to formulate the current meaning of social capital. These factors include individuals, organizations, community and social structure, as well as society as a whole (Katz & Krueger , 2016). Clearly, a lot of recent research has applied the concept of social capital to a wider range of social phenomena, which include relationships inside and outside the family, and relationships within and outside the organization. Such a large amount of research concerned with the concept of social capital indicates the growing importance of this topic in many fields of modern life, where communication and collaboration are both important and necessary (McCallum & O'Connell, 2009).

The following table summarizes the phases of integrating social capital into the literature of business:

Table 2.1 Phases of social capital integration into literature

Phases of social capital integration into literature	Reference
The concept of social capital originally occurred in community studies	Jacobs ,1965
The beginning of focus on social capital into literature about organizations	Adler & Known ,1999

The concept of social capital gained increasing attention since the mid of the 1990s	Schuurman ,2003
Social capital has become part of economic analysis	Menkhoff, et AL.,2007
A large amount of research concerned with the concept of social capital indicates the growing importance	McCallum & O'Connell, 2009

2.4.2 Definition of social capital

The concept of social capital has numerous definitions in literature; however, these definitions do not convey any new ideas to sociologists and political scientists. The concept simply reflects an awareness which has increased and evolved since the foundation of the disciplines, so that there is no one agreed definition of the concept. That is why the definitions of social capital seem to be endless. One of these definitions' states that "Social capital refers to features of social organization, such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions" (Putnam, 1993). Bourdieu (1981) refers to it as "The totality of actual or potential resources related to the possession of a lasting network of more or less institutionalized direct or indirect social relations" (Schuurman, 2003). Another definition calls it "The component of human capital that allows members of a given society to trust one another and co-operate in the formation of new groups and associations" (Coleman, 1988).

Social capital has also been defined as "the ability of people to work together for common purposes in groups and organizations" (Fukuyama, 1995) and as "[t]he information, trust, and norms of reciprocity inhering in one's social networks" (Woolcock, 1998). The World Bank defines it as "the institutions, relationships, and norms that shape the quality and quantity of a society's social interaction" (Jones & Taylor, 2012), and also refers to "[n]etworks

together with shared norms, values, and understanding that facilitate co-operation within or among groups" (OECD , 2001).

In addition, in his definition of social capital, Lin (2001:19) states that it is "investment in social relations with expected returns in the marketplace". Operationally, Lin defines social capital as the "resources embedded in social networks accessed and used by actors for actions".

According to Lin, the concept has two significant elements: (i) it signifies resources entrenched in social relations rather than individuals; and (ii) access and use of such resources reside with actors. Lin clearly considers social capital to be a social asset, in which relations between actors and access to the available resources in the network or group can be useful to both the group and the individual members.

From a similar prospective, Robison et al. (2002) refer to social capital as "a person's or group's sympathy toward another person or group that may produce a potential benefit, advantage, and preferential treatment for another person or group of persons beyond that expected in an exchange relationship". They claim that their definition includes the properties of classical capital, while separating what it is (sympathy) from what it leads to (potential benefits), and concentrating on the transformative capability of capital which resides in human relationships.

These definitions of social capital show that Putnam's approach is rather different from those of his predecessors. For example, Bourdieu saw social capital as an advantage that is mainly accumulated by individuals through their participation and collaboration in a group of social relationships. His main concern was indicating how class status or distinctions between individuals occur through the inter-connections between different spheres of economic, political and cultural life. Bourdieu was not convinced by the human capital explanation proposed by sociologists of education, and reflected how diverse types of capital – cultural, social, and educational – are converted into one another, and how these capitals are attached to

individuals and socio-economic groupings (Smith, et al., 2002). On the other hand, Coleman treated social capital as being similar to human and physical capital, tightening the qualitative conceptualization of Bourdieu (Wilde, 2000).

Scales et al. (2020) define social capital as relationships or resources. They claim that social capital is important, as it has generally been linked to positive outcomes for children and young adults. Moreover, Quibria (2003) revised diverse definitions of social capital and concluded that social capital represents an individual asset which arises from access to networks and social connections. Others see it, however, as a shared asset that exists in a collective homogeneous entity, such as a community that has shared values and common interests. Some definitions have concentrated on tolerance and trust tolerance, while others have focused on the amount of civic and social engagements which are the vehicle for such social capital, or on issues related to culture and social norms (Yang, 2007).

2.4.3 Dimensions of social capital

One of the best classifications of the dimensions of social capital is that of Nahapiet and Ghoshal (1998). They suggest that social capital is a concept with three dimensions: structural, relational and cognitive.

Structural dimension Structure is imperative for the creation and utilization of social capital (Widén-Wulff & Ginman, 2004). The structural dimension points to the design of connections which exist between the members of a network. This dimension has some important aspects: ties between the members of a social network; the structure of a network based on density, hierarchy and connectivity; and the flexible use of networks (Nahapiet & Ghoshal, 1998). According to Bolino et al. (2002), this structure could include what they call the indicators of structural dimension. These indicators include structural holes (a lack of relationships between network members), concentration (the quantity of focused relationships between a few network members), and density (the possible relationships compared to the

actual relationships between the network members). Interactions between the members of an organization made by electronic or physical means, such as teamwork, meetings, emails or online debate forums can facilitate the access to knowledge of numerous members. As a result, the creation of knowledge increases (Chua, 2002). In addition, the location of a member's contacts within their social network represents a definite source of advantage. Such contacts enable individuals to obtain information, resources and jobs. Nahapiet and Ghoshal (1998) proposed that this structural dimension of social capital is related to knowledge sharing and related activities (Fafchamps, 2006).

Relational dimension the relational dimension of social capital comprises assets that are generated by and benefit from relationships. It relies on relationships between people that influence their behavior in areas such as respect and friendship. Such relationships represent the basis for achievement of social needs including approval, sociability and prestige, and also result in the development of identification and mutual trust (Bolino, et al., 2002). Moreover, the relational dimension defines the degree of trust which results from the social interaction between individuals (Chow & Chan, 2008). In addition to the network of relationships, norms and trust are also significant sources of social capital. The main features of this rational dimension therefore include norms, trust, expectations, obligations and identification (Chow & Chan, 2008).

Cognitive dimension the cognitive dimension refers to resources that enable the formation of shared interpretations and meanings within an organization or network (Chow & Chan, 2008). This dimension of social capital exists in phenomena such as a common vision or language, which support a shared understanding of common goals and norms of action within a social situation. Inside large complex organizations, shared values and a shared vision enable the growth of the cognitive dimension of social capital, which benefits the organization by supporting individual and cooperative actions. The cognitive social capital of individuals

refers to the result of regular interactions while sharing the same practices that allow the individuals to gain knowledge, skills and shared conventions. This enables everyone to improve, particularly in their work (Wasko & Faraj, 2005).

The following figure shows the three dimensions clearly:

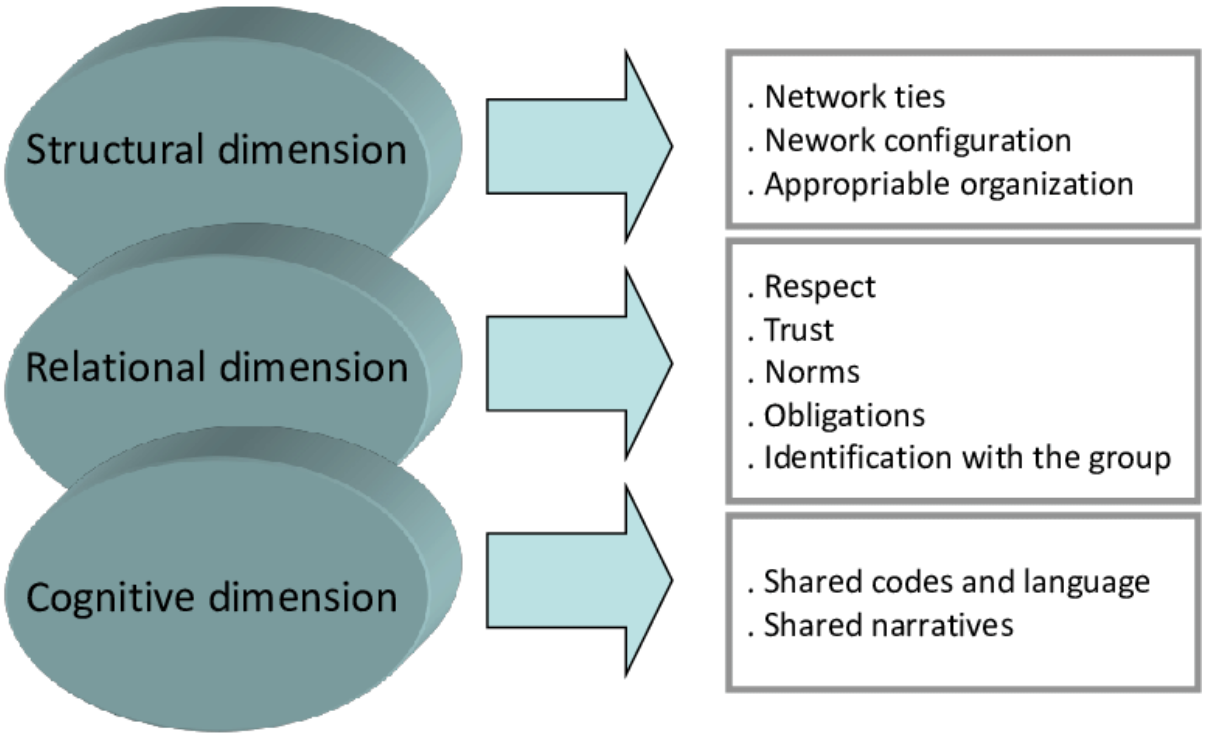


Figure 2.2 Dimensions of social capital

(Wasko & Faraj, 2005).

2.4.4 Types of Social Capital

The literature associated with the various functions and characteristics of social capital falls into different groups. The most common forms of social capital mentioned in the literature are: structural and cognitive social capital; bonding, bridging and linking social capital; strong and weak social capital; and horizontal and vertical social capital (Bhandari & Yasunobu, 2009).

(a) Structural and cognitive social capital Structural social capital is associated with the form of social networks and other structures such as clubs, associations, cultural groups and institutions and is supported by the procedures, rules, and patterns which govern them.

Cognitive social capital includes communal values and norms, and the beliefs and attitudes of individuals associated with cooperation, trust and reciprocity (Uphoff & Wijayaratna, 2000).

The more objective structural social capital enables jointly useful collective actions through the creation of roles and strong social networks which are supported by procedures, rules, and patterns. This is in addition to providing benefits to individuals, such as finding a job, gaining information or getting access to resources. However, the more subjective and intangible cognitive social capital drives people in the direction of mutually useful collective action through their shared values and attitudes. These structural and cognitive forms normally become interrelated and strengthened. This twofold characteristic means that it can be difficult to measure social capital if one only concentrates on one dimension and not both (Oorschot, et al., 2006).

(b) Bonding, bridging and linking social capital Bonding social capital signifies the ties which exist between people who are very close to each other and know each other very well, such as immediate family, close friends and neighbors. Normally, individuals in bonding networks are similar in their main personal characteristics, such as race, class, ethnicity, age, gender, education, religion and political associations (Oorschot, et al., 2006). Bonding encourages the communication and relationships which are required to follow common goals.

It also affects the creation and development of community organizations. On the other hand, bridging social capital symbolizes the presence of distant ties between similar persons, such as looser friendships and relationships at work. Normally, people in bridging networks differ in their main personal characteristics. Bridging narrows the gaps which exist between

diverse communities and is therefore vital when establishing solidarity and following common goals.

Bridging is essential when solving problems within a community as it involves people getting to know each other, creating relationships, and sharing information and community resources.

Linking social capital refers to ties and networks between persons and groups with very diverse social positions and power. It includes relationships between people in unrelated situations, such as those who are in different communities altogether, and could include networks and ties between a specific community and states or other agencies. In practice, social ties may create 'bonding' in one respect and 'bridging' in another. This distinction is useful when considering diverse types of social relationships between people within one community and their various different outcomes (Field, 2003).

(c) Strong and weak ties Strong ties indicate close, tenacious and binding relationships, such as those between family members and within close friendship groups. However, weak ties are consistent with more temporary, casual and dependent relationships, such as those between people from dissimilar backgrounds and friends who have diverse social positions. Strong ties arise from affection, love, readiness to help and exchange of knowledge used to help other members of the group. Such strong ties generate solidarity and provide personal support, while weak ties are useful only for informational support. Weak ties bond people to wider communities and to a broader range of possible resources, serving as a method of assembling resources, ideas and information that enable collective actions inside the community (Rowlands & Tan, 2014).

(d) Horizontal and vertical networks Horizontal social capital symbolize the lateral ties between people of similar status and power in a society, whereas vertical social capital symbolizes ties between people of different hierarchies and unequal power relations.

Horizontal social capital uses shared values and norms, while vertical social capital is enabled by formal hierarchical structures. Like bonding and bridging, horizontal social capital includes miscellaneous groups of people, and it enables connections and general mutual goals to be created among community members via civic engagement. Like linking, vertical social capital creates connections between individuals, community leaders and decision makers, producing a suitable environment for social change through laws and policies (Hawkins & Maurer, 2010).

2.4.4 Social capital in social media

Social media such as Facebook, Twitter, Instagram, Linked In, and WhatsApp have attracted immense numbers of users, reaching hundreds of millions in the last few years. Social media websites facilitate connections with strong ties such as close friends and relatives, and also with weak ties such as acquaintances or followers (Ellison, et al., 2017). They enable users to make new connections with blurred audience boundaries, where discrete audiences are distorted into one general audience (Marwick & Boyd, 2011). Moreover, they produce different types of public and private communication: directed communication, such as liking, tagging or commenting, or more passive communication, such as silent follow-up and browsing the user's newsfeed (Burke, et al., 2011). In this context, research has investigated the relationship between social media and interpersonal relationships, as well as its impact on them and its effects, such as the information and emotional support that people can receive from their social network use (Ahmed, 2019).

Research into social capital has indicated numerous benefits from using social media networks. These include strong ties that can provide emotional support (hence also bonding capital), and weak ties which provide non-redundant information and different perspectives (bridging capital) (Valenzuela, et al., 2009).

2.4.5 Factors affecting social capital

According to Lochner et al. (1999), there are four community level constructs which are associated with social capital and could affect it: collective efficacy; a psychological sense of community; neighborhood cohesion; and community competence.

a. Collective efficacy Collective efficacy is defined as a "sense of collective competence shared among individuals when allocating, coordinating and integrating their resources in a successful concerted response to specific situational demands" (Lochner, et al., 1999). It has also been defined as "social cohesion among neighbors combined with their willingness to intervene on behalf of the common good". Both are said to measure collective efficacy on two separate sub-scales: social cohesion and informal social control (Sampson, et al., 1997).

b. Psychological sense of community This refers to "the sense of belongingness, fellowship, "we-ness", identity, etc., experienced in the context of a functional (group)". In other words, it is the feeling of belonging experienced by members of a community, the feeling that individuals matter to each other and to the whole group, and the shared faith and commitment to the perception that the individual needs of every single member in the group will be satisfied if they work together (Buckner, 1988).

c. Neighborhood cohesion This refers to "social interactions by which citizens establish social connections that are either personal or at the neighborhood level". Well-established interactions between individuals in the group foster social capital (Westlund, 2006).

d. Community competence This refers to "the problem-solving ability of a community that arises through collective effort, which includes features of individual and community activism". When this community competence increases, it will improve the level of social capital within the society, so that the group can overcome any problems that might occur, leading to better living conditions for all (Singh & Koiri, 2016).

2.4.6 Measurement of social capital

An in-depth review of the literature of social capital clearly shows that there are several ways of measuring social capital. However, this review suggests that there is no agreed best method or any single instrument that can capture all the aspects of social capital. However, the most common categories of measure in the literature include: community social capital; family social capital; and, to a lesser extent, peer social capital. In addition, social capital has most often been measured using survey instruments (e.g. position generators, name generators), as well as, to a lesser extent, electronic data collection tools such as smartphones, Bluetooth sensors and online social media sites (e.g., LinkedIn, Twitter). However, these tools can only measure a limited number of social capital dimensions. Most of the measures of social capital do not capture both relationships and resources (Scales, et al., 2020).

2.4.7 Significance of social capital

Social capital is now used to understand the different roles played by non-economic elements in economic life, such as values, norms, trust, networks and social sensitivity. It is clear that social capital positively supports market actions, reduces transaction costs, and encourages innovation, entrepreneurship and the spread of technology. It therefore leads to better economic results. The establishment and persistence of social capital generally represents a major driver of economic and social progress (Sparks, 2020).

Social capital can be related to certain types of economic outcome. For instance, social contacts could be principally significant for providing job referrals, and research indicates that candidates with referrals are more likely to get a job and then remain longer in that position (Brown, et al., 2016). Furthermore, even poorly established social networks could fuel lateral mobility, which helps avoid the spread of unemployment in the community (Smith, 2016). In addition, social capital is a significant contributing factor of job productivity, although results

about the influence of social capital on salaries are mixed (Greve, et al., 2010). Greve, Benassi and Sti (2010) examined the effect of social capital on job productivity and discovered that it was an important influence, as being part of a network can enable teamwork-based projects and lead to the attainment of professional knowledge. McDonald (2015) analyzed information and data from the National Longitudinal Survey of Youth and showed that employees who used their social networks to look for jobs gained significant wage benefits, in contrast to employees who found jobs by other means. The absence of a network may even negatively affect one's capability to meet pre-existing financial requirements. For instance, low-income non-custodial fathers may struggle with unemployment, as they are incapable of obtaining information about available jobs from social contacts, and therefore cannot pay child support. This sometimes results in imprisonment (Pate , 2016).

2.4.8 Social capital and knowledge sharing

In knowledge-based economies, social capital represents a significant organizational competence which enables organizations to create and share knowledge, providing them with the advantage of a sustainable organization as well as ideal performance. In general, social capital comprises institutions, relationships, norms, tendencies and values that manage the behaviors and interactions between individuals which take place within the organization.

Social capital consists of three dimensions: structural capital, cognitive capital and relational capital (Khaliq, 2014). Knowledge sharing includes a group of behaviors, which lead to information exchange between individuals, enabling them to help each other achieve higher performance. This leads to the perception that knowledge sharing is a positive influence on innovation within organizations (Michailova & Minbaeva, 2012).

Not all individual employees or organizations have the comprehensive knowledge that can lead to success. Hence, it is obvious that they depend on external sources of knowledge. In this respect, a great deal of knowledge occurs in social interactions between individuals (Lang,

2004). Mu, et al. (2008) understand that knowledge creation and knowledge sharing are both processes that cannot take place through compulsion; instead, they are social processes which are eased and enabled by social capital. In other words, social capital enables the process of knowledge sharing. The presence of external networking enables individuals to acquire knowledge which is not otherwise available. Similarly, these external networks enable individuals in these organizations to gain knowledge in the form of information, expertise and ideas, without the restrictions of the hierarchies and local rules (Wasko & Faraj, 2005).

According to Nahapiet and Ghoshal (1998), social capital is a positive influence on the conditions necessary for knowledge creation and sharing. The level of collaboration in a social network also enables knowledge sharing to exist and flow easily (Lin, 2007).

In fact, the effective use of Artificial Intelligence (AI) in the processes of knowledge sharing can facilitate all the tasks and duties performed by social capital. Through AI, the various artificial devices used by the organization can help the flow of knowledge and accompany it with justifications and explanations, enabling individuals to better understand the nature of their tasks as well as the best ways to perform them. Moreover, AI can also provide high expectations of the knowledge needed to improve the skills and outcomes of social capital, which, in turn, improves the overall performance of the organization (Samad , 2020).

The work of Berraies et al. (2020) mainly aims to examine the mediating role played in the workplace by employee well-being in the relationship between the dimensions of social capital (structural, relational and cognitive social capital and knowledge sharing), as well as the role of enterprise social networks which moderate between knowledge sharing and employee well-being. To achieve the objectives of this paper, its author has decided to perform a quantitative approach with a sample of 168 middle managers in knowledge-intensive firms in Tunisia. In addition, the partial least squares method has been adopted to analyse the data collected. The findings of this study are shown to be significant, as they highlight the

importance of social capital as a lever for increasing knowledge sharing. The study's results also confirm that, while the use of enterprise social networks does not moderate the relationship between employee well-being and knowledge sharing, it has a positive and significant effect on knowledge sharing.

2.5 The context of Artificial Intelligence

The concept of Artificial Intelligence (AI) has become increasingly key to the area of computer science that highlights the creation of intelligent machines which function and react like humans. The activities and functions that computers with artificial intelligence can perform include the following: knowledge, learning, planning, speech recognition, problem solving, deep learning, machine learning, the ability to manipulate and move objects, computer programming, reasoning, medicine and knowledge engineering. In other words, artificial intelligence is a branch of computer science, which seeks to create intelligent machines to perform many tasks and activities. It has therefore become an indispensable part of the technology sector (Habeeb, 2017).

In fact, machines can act and react in the same way humans do, if they have plentiful information about the world around them. Thus, artificial intelligence needs to have access to objects, properties, categories and the relationships between them, so that it can apply knowledge engineering. Initiating reasoning, common sense and problem-solving in machines is difficult. Learning without any type of supervision necessitates the capability to identify patterns in streams of inputs, while learning with suitable supervision includes classification and numerical regressions.

Alongside the increasing interest in artificial intelligence, knowledge sharing as a component of knowledge management is receiving more attention in most areas of life.

Nowadays, there is a movement in favor of building knowledge for individual and organizations. Knowledge sharing could play a critical role in the transformation of knowledge

held by individuals into public knowledge. One of the main building blocks for developing and enhancing knowledge sharing is AI. Many knowledge management specialists and theorists are now overseeing this AI so that it can be used in knowledge sharing within organizations (Jarrahi , 2017).

Both artificial intelligence and knowledge sharing center on the concept of "knowledge", which is fundamental to both of them. In addition, artificial intelligence provides all the mechanisms for machines which enabling them to accumulate knowledge and learn.

Moreover, AI helps machines to obtain knowledge from various sources, process information by means of systematic rules, and then apply this knowledge in the places where there is the greatest need to share it.

To make effective decisions, machines need to unlock the knowledge stored in their systems. In this respect, decision-making represents a key challenge in the fields of both knowledge sharing and artificial intelligence. This is why experts are certain that AI and knowledge sharing represent two sides of the same coin. They also believe that machines will be capable of enlarging, creating or using knowledge in previously unimaginable ways, but only if there is a dependable online knowledge base (Singh, 2018).

The unique association between artificial intelligence and knowledge sharing has led to the existence of cognitive computing. This uses several computerized models, which process information in the same way as the human brain. It has two main components: deep learning and self-learning neural networks. The software programs used to carry out cognitive computing now make use of pattern recognizers, natural language processors, and data/text-mining methods, to imitate the activities carried out by the human brain. (Castrounis, 2017).

2.5.1 Knowledge sharing in the context of AI

If experienced employees share knowledge with new employees, it helps the latter to learn their new jobs more quickly. The remarkable connection between AI and knowledge sharing could act as a disruptive technology, leading to advances in existing business management systems.

Several researchers and experts claim that the latest technological advances could increase the number of knowledge bases in the future. As a result, AI-based knowledge sharing systems could dominate the future of business management systems with effective knowledge management and analytical approaches (Santos, et al., 2020).

The concept of Artificial Intelligence (AI) dates back to the middle of the twentieth century, when massive shifts took place in the speed of information processing and electronic data storage capacity increased dramatically. This was accompanied by reductions in processing costs, storage costs and hardware prices (Baum & Haveman, 2020). These improvements have created hope that AI will be used more widely. AI was first proposed in the 1950s and has had a major impact on business. Existing research has shown that one of the most influential uses of AI has been machine learning (ML), in which computer algorithms are employed to produce models quickly and automatically. Such models are used for clustering, categorizing and inferring, without any dependence on explicit, human-developed instructions (Jordan & Mitchell, 2015). Machine learning enables various manual tasks to be performed automatically. Larger and richer databases also currently exist, while complex data is now recognized and analyzed almost instantaneously. Parsing texts are read; millions of images and speech texts are recognized; different languages are translated; and intricate patterns in complex data are revealed.

AI can be employed for different purposes including education and business. ML algorithms make the processes of document and data handling easier. Sales predictions are now

more accurate. More drugs are now being discovered. Communications have been improved, and resources are now more effectively utilized (Agrawal, et al., 2018).

Artificial intelligence has many definitions and broad theoretical interpretations. Most researchers differentiate between two types of artificial intelligence: general artificial intelligence and narrow artificial intelligence (Raj & Seamans, 2019). General artificial intelligence is defined as "computer software that can think and act on its own". However, nothing like this presently exists. On the other hand, narrow artificial intelligence is said to be "computer software that relies on highly sophisticated, algorithmic techniques to find patterns in data and make predictions about the future" (Broussard, 2018). This definition indicates that the software "learns" from present data and hence represents "machine learning", where the machine can improve its tasks, which are programmed, automated and routine. However, this does not mean that the machine could gain knowledge or wisdom (Gamio, 2020).

Artificial Intelligence (AI) is a joint field of psychology, cognitive science, neuroscience and engineering. The concept of AI has extensive implications for the field of knowledge management. Since 1952, there has been extensive research by AI researchers into the ways in which the human brain thinks, stores information, separates it, relates or clusters it, and eventually responds with actions. This was the point at which the concept of human engineering came into existence, establishing the foundation of artificial intelligence with its extensive implications for many areas of human knowledge (Rich & Knight, 1991). The mechanism of the human brain which allows it to receive information, code it into neural signals and then convert it so that it is suitable for many different functions has been generally studied, and human reasoning and problem-solving have been applied to it (Crowder & Friess, 2013).

Over time, a large proportion of managers and business leaders have become convinced that the topics of technology, people, process and content should be deliberately tackled to

drive future achievements. To be successful in the highly competitive modern world, organizations need to pay more attention to the highly technological environment. In many organizations, about one-third of the knowledge management budget is explicitly allocated to technology (Aparna & Ramachandran, 2019).

Using artificial intelligence mechanisms that enable thinking, learning, accommodating and accumulating to take place automatically, autonomous functioning has become an important goal for computer science. As knowledge management is a field of in which knowledge is processed, created, shared, used and managed, this has major implications for artificial intelligence with its multidisciplinary approach to achieving the aims of an organization by making the most effective application of knowledge (Aparna & Ramachandran, 2019).

2.5.2 Social capital (social media) in the context of AI

In the past three decades, much previous research has cast light on the relationship between social capital (SC) and information and communication technology (ICT). However, there has been rather less research and video-sharing systems (Ahmad & Widén, 2018).

Advances in AI had varied effects on social capital. These changes reflected the increasing use of, and improvements in, AI applications, which have been changing rapidly.

Recent research has demonstrated that AI has a direct impact on social capital, Individuals who possess a higher cognitive social capital are positive towards AI. On the other hand, “Structural social capital: contact with others” leads to a negative view of AI. Those who have frequent contact with others prefer humans to AI. Since “contacts with others” mainly represents daily social contacts with neighbors, and with friends and acquaintances in a neighborhood, this may represent homophily or networks among people with the same background. People who have close contacts with others may have difficulty in adopting a new “relationship” with AI (Inaba & Togawa , 2020).

An example of social media and its association with both artificial intelligence and knowledge sharing is ChatBot, a software program which conducts a conversation via either auditory or textual methods. This kind of software program is designed to imitate the ways in which a person would behave as a conversational partner, at any distance. ChatBots are typically used in dialogue systems for purposes including information acquisition or customer service (Bradeško & Mladenić, 2017). Today, most ChatBots are accessed using virtual assistants including Google Assistant and Amazon Alexa, messaging apps such as Facebook Messenger or WeChat, or the apps and websites of individual organizations (Orf, 2016).

ChatBots can be classified into categories of use that include conversational commerce (e-commerce via chat), entertainment, finance, education, health, news and productivity.

2.5.2 Social barriers to Artificial Intelligence

The quantity of academic papers on Artificial Intelligence (AI) and its applications in different business and management areas has risen significantly in the last decade. This rise has been accompanied by an increase in the number of systematic literature reviews. In addition, the social impact and ethical implications of AI have become topics of compelling interest to industry, academic researchers and the public. However, there is a lack of systematic reviews of some of the early adopters of AI such as the financial and retail sectors. AI can be expected to have critical social impacts around the world, with have significant regional variations.

Similarly, the perception and understanding of AI are likely to be profoundly shaped by cultural contexts (Hagerty & Rubinov, 2020).

Although AI provides solutions to many of today's complex problems and is part of civilization now and in the future, it seems that numerous social issues could also be caused by artificial intelligence. Research and real-life experience both show that artificial intelligence is becoming part of everyday life, enhancing and supporting human knowledge and practice in almost every domain, including driving, avoiding traffic, finding friends, choosing the perfect

movie and even cooking a healthier meal. Moreover, AI has the potential to provide business with new functions, such as gathering knowledge from previous projects that could help to determine future project outcomes (Perce, et al., 2019).

Despite its integration into people's social lives, AI is currently being confronted with issues including a lack of preparedness to use it in social intelligence. Since different people's interests are not the same, it seems impossible for AI to cope with the diversity of these interests. It is not easy for AI to take the most appropriate decisions when handing human interests, because it is not a human with a human mind and feelings (Abott, 2018).

Discussing this issue of decision-making, many articles examine a critical social dilemma related to AI: the issue of cooperation, compassion and selfishness. When machines, vehicles and everything else with integrated AI needs to make a critical decision, about whether this decision will benefit the owner of the machine or the public (Tanimoto , 2018). This is a real dilemma. For example, an autonomous vehicle may need to choose between running over pedestrians or sacrificing itself and its passenger to save them. The key question is how to code the algorithm so that it makes the 'right' decision in such a situation. And does the 'right' decision even exist? Surveys have shown that participants in six Amazon Mechanical Turk studies approved of autonomous vehicles that sacrifice their passengers for the greater good and want others to buy them, although they would themselves prefer to ride in autonomous vehicles that protect their passengers at all costs (Bonnefon, et al., 2016).

This clearly shows that although AI is beneficial, as it enables people to make stronger and deeper relationships with others, it is not expected to be cooperative or sympathetic with others when making decisions. This is simply because it is not human, but has been created to serve its owners and provide them with the maximum benefit. When it comes to sacrifice or compassion, it will always be on the side of the individual against the group (Cubric, 2020).

2.6 Social capital and civic engagement

There have been many studies investigating the relationship between social capital and civic engagement. In an empirical study, Putnam (2000) linked social capital to civic engagement, finding that there is a strong empirical relationship between the existence of voluntary associations with a society and the quality of life in that society. The results showed that engagement in voluntary associations produce both individual and collective benefits. Putnam claimed that the individual and collective benefits obtained from this civic engagement were the direct result of stocks of social capital, which he defined as "social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2000). In addition, Putnam concluded that societies with high levels of social capital enjoy the presence of efficient political structures which are responsive to the needs of their citizens and committed to the realization of those needs. Most importantly, he found that citizens of communities with high social capital showed higher levels of civic engagement in politics, and in other social activities that benefit society as a whole.

Verba et al. (1995) found that involvement or engagement in voluntary associations led to the development of beneficial civic skills, established politically advantageous social networks, and created opportunities for employment. They also argued that social capital has significant implications for the efficiency of political, economic and social action, and the potential increase of civic engagement in political and social activism (Verba, et al., 1995).

A theme that occurs throughout the literature about social capital and civic engagement is the importance of trust. Coleman (1988), Putnam (2000) and Uslaner (2005) all indicate that trust is an important constituent of social relationships, which are essential for creating social capital. More precisely, they claim that social capital tends to be used most effectively when social interactions take place within an environment characterized by mutual trust and norms of reciprocity. Therefore, in the literature about social capital, trust reflects the belief that there

are fundamental values and ethics which are shared by all community members. In such a community, there is more interest in people who are connected to each other but different from each other; such collaborating people have a moral responsibility for their fate (Uslaner, 2002).

This means that trust encourages sociability and cooperation between community members or social networks. These values are both important for effective and successful civic engagement (Shirkey, 2011).

Moreover, AI can play a role in enhancing the civic engagement of social capital within organizations, where robots and other machines can help solve customers' problems more quickly and effectively. Knowledge sharing is involved in this process, as AI can use the shared knowledge as inputs in order to analyze the needs of customers and their levels of commitment, which can in turn improve the service provided by the organization. AI can also solve any problems which might occur because of its relationship with the shared knowledge and the organization's social capital. This shows that AI cannot be isolated from social capital and civic engagement, but should be integrated with them.

2.7 Research gap

Based on the literature review, it is evident that there is a gap in the literature. The majority of the available research sheds light on the topics of social capital and civic engagement alone, or correlates one of them with another variable or with each other. Other research attempts to correlate social capital or civic engagement with one or more of the present research variables. One of the earliest studies (Adler & Kwon, 1999) discusses social capital alone, indicating its advantages and disadvantages. Bhandari & Yasunobu (2009) present the most significant definitions and features of social capital. Some research attempts to correlate social capital with other variables mentioned in this research. For instance, Aslam et al. (2014) explore the relationship between social capital and knowledge sharing, while Berraies et al. (2020) examine ssocial capital, employee well-being and knowledge sharing. The picture is similar

for civic engagement. Adler and Goggin (2005) focus on the definitions of civic engagement and its most prominent characteristics. The work of Asdourian and Zimmerli (2018) centres on the importance of civic engagement. Dubow et al. (2017) examine the relationship of civic engagement with information technology. Cho et al. (2020) also focus on civic engagement.

Very little research explores the relationship between social capital and civic engagement. It is possible that only Al-Ansari et al. (2020) examine the impact of AI-based social capital on civic engagement in an environment of changing technology. This seems to be the closest study to the present research, as it investigates the impact of AI-based social capital on civic engagement. However, this study does not use knowledge-sharing as a mediator variable. To summaries, the observed gap in the literature is as follows: very little research attempts to correlate civic engagement with social capital, using the absence and presence of knowledge sharing as a mediator variable, and AI as a context.

Based on this gap in the literature, the researcher is able to state the problems with the present research. Many issues prevent people from taking part in community work, particularly with today's work pressures and economic recession. Civic engagement also faces challenges in the modern era of AI (Cubric, 2020). With the advent of social media platforms, more opportunities are created for presenting the concept of civic engagement (Abbott & Reilly, 2019) and the initiatives that it makes possible. The literature clearly defines both civic engagement (Adler & Goggin, 2005) and social capital (Ahmed, 2019). This could enable different segments of Bahraini society to understand the meaning of each concept, as well as the related practices and initiatives (Agrawal, et al., 2018). Nevertheless, there is little evidence about the ways in which AI-based social capital could impact civic engagement practices when AI also allows effective knowledge-sharing (Cho, et al., 2020). This is the major research problem that the present study focuses on. To solve this research problem, the researcher has drafted some questions that he will attempt to answer. The first question will enable him to

identify the extent to which bonding and binding can be linked to social media. The second question will establish the extent to which social capital can impact knowledge sharing. The third question attempts to determine whether knowledge sharing can be linked to civic engagement. The fourth question explores the relationship between trust and values on one side and civic engagement on the other. The aim of the fifth and final question is to measure the extent to which social capital can affect civic engagement. When these questions are answered, the researcher predicts that the research problem will be solved.

2.8 The Bahraini Context

There are well-perceived endeavors to foster civic engagement and social capital in the kingdom of Bahrain.

The Kingdom of Bahrain is considered as one of the leading countries in the Arabian Gulf region, which located in the middle east, being an island gives it more value for attack people from all over the world, not only this wonderful location is the reason is that gives Bahrain island in the middle of the Arabian gulf sea and that gives it a priority on many areas, being in such a geographical location also helps the economy by letting the traders and sailors from all the countries around to come work and trade in pearl, Bahraini pearl is very known in the world by its high quality, this and many unique characteristics let the Kingdome of Bahrain to beginning of what was considered an earlier revolution countries in the region to start a unique economic and social development revolution, that attract the people to live and participate in its development which was enriched by the diversity, and eventually stays in Bahrain, this early high intensity of society was the basis of having one and the first a high level of freedom because it have and one of the best and oldest political systems in the region, that support all the small groups equality in the society, the early formation of bridging and bonding social capital was an boost to becoming a society with proper relations developed with the time and embraced by the people.

By providing a coherent Parliament democratically constitution as a tool to legalize laws that guarantee equality, and support the societies institutions, the first library club in Bahrain was established in 1919 in the capital "Manama" was one of the first in gulf countries, as well as the first women empowerment association, was found in the gulf 1953 and called "Association of the women renaissance of Bahrain" women, was that was correlated with the human right declaration to the same goal, thus kingdom of Bahrain was one of the first countries on the middle east has signed that declaration.

Based on the above, which gives us a glimpse of how to understand the beginning of a developed society that based on high intensity and diversity, as well as having such variety was the origin of this unique social capital creation, which gives the county a chance to be distinguished society, on the country level whether on the private and public sectors. this early formation of the society which is before many decades, effects in development in many factors, such as knowledge sharing and civic engagement, for many reasons and their goal is to achieve high knowledge sharing to the society and develop individual welfare and guarantee the variety and trust panels that let the society express their selves and their voices to be heard by the government and vice versa.

2.8.1 Civic engagement in Bahrain

The government of Bahrain has strides to foster civic engagement through an open and participatory governance using Information & Communication Technologies (ICT). eParticipation has been considered as a tool to strengthen the public engagement and the collaboration with government. It aims at improving access to information for the citizens and residents as well as fostering citizen's empowerment and participation in public service improvement, and involvement in the decision-making process.

The e-Participation Initiatives are evident since the government has launched many initiatives to foster and encourage the public participation and empower the individuals and

businesses to share thoughts and be engaged in the national development plans. One of these initiatives include the Crowdsourcing (community collaboration model). Towards its commitment of using Crowdsourcing (community collaboration model), the eGovernment program has a coherent and well-defined set of goals and objectives that led to conceiving various e-Services initiatives, which are harmonious with the dynamic nature of the digital environment to ensure the sustainability and success of the planned initiatives. All the initiatives that are planned & implemented based on the model take a citizen's view of what eGovernment will look like and adopt technology to enhance Government to Citizen (G2C) interaction. One such initiative that utilizes the crowdsourcing model is Fix2Go feature in Tawasul app launched in April 2014.

One of the most widely appreciated e-Participation Tools is "The National Suggestion & Complaint System (Tawasul)". The Tawasul system was launched in 2014 with the aim to provide a one-stop-shop channel for the public to interact with governmental entities regarding any suggestion, compliant or enquiry very easily and at most convenience. Tawasul is featured with many technical advantages that streamline the case handling process by the government entity at a pre-defined Service-Level-Agreement (SLA). Today, there are 37 government entities in Tawasul communicating with their customers through the system.

Tawasul Mobile App includes Fix2Go feature as a Crowdsourcing tool where it enables the user to snap any public default on the road or any public area and submit it to the concerned authority within less than 30 seconds. Fix2Go is featured with location detector through GPS and clear icons to describe the public issue without the need to identify the concerned authority.

In line with the national digitalization strategy of the Kingdom of Bahrain, the government has proactively taken the actions to engage effectively with the public through social media channels via the public authority's social media accounts to be closer to the public, responsive and available all the times. The government has also applied a social

media monitoring tool to monitor and analyze social engagement with the public through social listening and understanding the sentiments of the public's feedback.

2.8.2 Social capital

There are massive efforts exerted in Bahrain for the purpose of improving the status of social capital in the kingdom. The Kingdom of Bahrain has performed best in the “Prosperity Pillar” and “Social Capital” rankings as it scored 6 steps forward according to the “Legatum” prosperity Index 2018 ranking issued recently. According to the official website of “Legatum”, its ranking in the “Prosperity Pillar rankings” showed that Bahrain performs best on Economic Quality and Social Capital. The biggest positive change, compared to the previous year, came in Social Capital increasing by 6 places. Bahrain is currently in the 51st position in the overall “Prosperity Index” rankings when compared to last year.

2.8.3 Integrating social capital Social and civic engagement through Media Policy in Bahrain

The Kingdom of Bahrain has regulated and organized the communication of its social capital through the public authorities when it the launch of the Social Media Policy. The policy has been drafted jointly by Ministry of Information Affairs and iGA and provides clear guidelines for senior officials and employees on how to use the social media tools to facilitate communication with the social capital about civic engagement initiatives in Bahrain.

This does also include using social media hashtags to showcase the latest events, projects, services and initiatives in Bahrain, and to engage all members of the community in the conversation about their topic of choice. It also provides the public with an opportunity to present their views on government projects through various social networking sites.

2.9 Conclusion

This chapter has reviewed the literature about concepts relating to civic engagement in depth. It also presented the current limitations faced when using traditional methods of civic engagement and the ways in which a changing technological environment may affect this concept, either by overcoming those limitations or solving new problems caused by advances in technology. An important concern that the review demonstrated was that technological innovations have the potential to affect civic engagement, resulting in lower participation in civic engagement activities. However, there is little in the literature about the future of civic engagement activities in an environment characterized by technological innovation. This chapter outlines a method which will make it possible to predict whether technological innovations will strengthen civic engagement or lead to decreased participation. Using social capital as the environment, this chapter has introduced the concept of artificial intelligence in social capital and investigated how social capital affects civic engagement. The review has focused on Artificial Intelligence, which has attracted global attention and promises to change the world order, including civic engagement, in an unprecedented way. Artificial Intelligence (AI) is likely to play a major role in removing many limitations currently faced by civic engagement, implying that AI will either increase participation in civic activities or at least maintain the status quo. In particular, the literature shows that AI is expected to bring benefits to a community engaged in civic activities, although it is not yet clear what its influence will be (Gosman & Botchwey, 2013).

In fact, the concepts of civic engagement and AI are both widely used when discussing the future of business and business organizations. The potential applications of these two concepts in different areas of business have received increasing interest from business experts and researchers, who are particularly concerned with the ways in which AI could replace people in the workplace. Using civic engagement and AI to customize business processes and

decisions could produce outcomes which are better suited to individual needs and expectations while also improving the efficiency of business organizations (Bill & Melinda Gates Foundation, 2020).

The field of civic engagement is now at a crossroads, with volunteers increasingly opting out of activities. The problem has been further compounded by a number of challenges that have affected the civic engagement movement. Developing technologies, including AI, have presented new problems such as a lack of user understanding of the technology, leading to confusion in the people's minds and questions about their participation in civic engagement activities. Technology is often thought to be a very useful tool for people. However, a lack of understanding of the ways in which it should be used may lead to disengagement from civic engagement, an issue which is absent from the literature (OECD , 2020).

The literature review has shown that civic engagement could face serious challenges if AI is adopted, and there is currently little understanding of how these challenges could be overcome (Benshoten, 2001). While the literature suggests that it will be important to support civic engagement by addressing future challenges with Artificial Intelligence (AI), researchers including Baum and Haveman (2020) have also expressed concerns about the potential challenges that AI could itself produce, such as low participation. The introduction of new technologies such as AI can therefore be seen as problematic. However, there is little information in the literature about potential solutions to these problems. However, the literature also shows that concepts such as knowledge sharing and social capital can support citizens trying to overcome the challenges produced by AI (Castells, 2013). These concepts need further investigation, though, showing this to be another gap in the literature. Taking the above arguments into consideration, this chapter has developed a theoretical model that links civic engagement with social capital (as an example of a phenomenon affected by AI) and knowledge transfer (assuming that technological innovations always requires knowledge

sharing). This model uses previously tested theories and models, and aims to fill the gap found in the literature, while also addressing the research questions (Booth & Shaw, 2020).

Chapter Three: Theoretical Framework

3.1 Introduction

Following the literature review section, in which the research problem was described and the research variables presented, this section outlines the theories, propositions and hypotheses in more detail. The theoretical framework is a highly significant part of this research, as it provides specific choices that show how the data collection and analysis are organized. The theoretical framework also sets out the perspective that the researcher required to address the perceived gap in the literature.

The literature showed that a gap exists in the available literature, as there is very little current research into the relationship between social capital and civic engagement in the absence and presence of knowledge sharing and in the context of AI. Because of this gap, the research problem can be summarized as follows: research is required which explores the effect of social capital on civic engagement, with knowledge sharing as a mediator variable and AI as a context. In other words, the research will aim to make recommendations to those concerned about using social media (social capital) to increase participation in civic engagement using AI, as represented in this research by ChatBot. This is the main aim of presenting the theoretical framework. This framework proposes specific hypotheses that enable the research questions to be answered and the research problem to be solved. This means that the development of the hypotheses is main subject of this chapter. These hypotheses have been developed to present specific solutions to the research problem.

3.2 Background to the research

The literature review has shown that civic engagement involves a range of activities including the following: being educative, leading to individual voices being heard; being deliberative, by increasing transparency of decisions; improving knowledge of social needs; and contributing in improving governmental outcomes by thinking originally, in order to solve complex

problems (Salinas, et al., 2018). The review also shows that civic engagement can take different forms, and that it has challenges and limitations, including: negative public perceptions; logistical issues; difficulties in creating structures for participation; developing technology; and confusion when evaluating success (Gosman & Botchwey, 2013). These limitations have serious implications for civic engagement, in particular the possibility that participants will become disengaged from civic activities due to the complexities of new technology. While these limitations could to some extent be eliminated by the introduction of the latest technology (e.g. social media and AI), concerns have been raised by researchers about the potential use of new technology to assist community engagement (Dubow, et al., 2017).

For instance, Jans and Karp (2017) have examined the strategies or tools used in online platforms such as social media to establish how they could bring about positive social change and in turn produce sustainable solutions to problems currently faced by society. Their work indicates that introduction of new technology to support community engagement has many limitations which will need to be eliminated to prevent decreased participants in community engagement activities. Dubow et al. (2017) have argued that the use of digital technology in community engagement can produce ambiguous and unequal effects, a fact which will need to be taken into consideration before these technologies are introduced. Similarly, the research of Theocharis and Lowe (2016) into the relationship between internet use and political participation, before and after the introduction of social media, had mixed results, with some saying that internet use has improved political participation and others disagreeing.

It is claimed that the fourth industrial revolution, known as Industry 4.0, will increase opportunities and industry potential, with the help of digitisation. The previous arguments have shown that potential problems could hinder the use of new technology to increase civic engagement. However, developing technologies such as AI have brought new problems of their own, such as a lack of understanding of the technology by users, leading to confusion in

people's minds and questions about their participation in civic engagement. To test this, and to determine how, and to what extent, technology can affect civic engagement, it was necessary to find an example of a relationship between civic engagement and a phenomenon that can influence it (Al-Ansari, et al., 2020).

Using the literature review, social capital was found to be a suitable concept. It was investigated in order to determine how civic engagement could be affected if social capital is influenced by new technology. Social media represented social capital in the literature (Aslam, et al., 2014), while AI was built into social media in the literature (Baum & Haveman, 2020).

Thus, AI-based social media became the representation of social capital characterized by AI. However, clarity about the relationship between social capital characterized by new technology and civic engagement is blurred in the literature. In addition, a clear relationship between social media, AI and community engagement is not well defined in the literature.

Although researchers believe that establishing such a relationship could be beneficial for community engagement activities (Gluckman & Allen , 2018), and could possibly remove some of the barriers in the literature which affect civic engagement, a well-defined theory or model that could provide an understanding of the relationship remains elusive. However, a few studies exist that have addressed the relationships between social media and civic engagement and between AI and civic engagement, such as Skoric and Zhu (2016), and Wen and Wei (2018).

The relationship between social media and civic engagement is directly supported by the model developed by Wen and Wei (2018), although this relationship was found to be weak. The weak relationship between social media and civic engagement in this model contradicts the findings of other researchers, including Theocharis and Lowe (2016) and Dimitrova et al. (2014), who argue that there is a reasonably strong and valid relationship between the two.

This contradiction could be due to the changing character of social media influenced by developments in technology.

At this point, it will be prudent to assume that if social media has recently changed due to technological advances, then it is possible that the introduction of AI could also affect both social media and its relationship with civic engagement. As was outlined earlier, AI is a major technological change that promises to completely alter the ways in which people think, decide and act (Eidizadeh, et al., 2017), and is already embedded in some social media (e.g. ChatBot in Facebook). It therefore becomes necessary to understand the impact of AI on social media and, in turn, its effect on civic engagement. It can therefore be posited that social media involving AI does influence civic engagement but it is not clear from the existing literature whether this influence is direct or indirect, and whether other factors are also involved (Baum & Haveman, 2020).

Furthermore, it can be untenable to state that social media characterized by AI influences civic engagement, because AI is yet to fully penetrate the sphere of social media as well as civic engagement activities (Aparna & Ramachandran, 2019), thus creating a state of flux. People are still trying to understand the nature of AI and how it can affect their lives. In this situation. some argue that there is a need to share knowledge about the role of AI because not doing so could prevent people from exploiting AI-driven social media and thus improving civic engagement or, on the other hand, could stop them understanding the potential pitfalls of AI (Aparna & Ramachandran, 2019). In the worst-case scenario, participation in civic engagement could even decrease due to a lack of knowledge of AI or how to apply it.

This in turn indicates the need to understand that knowledge of AI, of AI-based social media and of the relationship between the two all need to be shared if civic engagement is likely to involve AI. Thus, knowledge sharing will therefore become important in any environment where AI-driven social media affects civic engagement. Researchers such as Wen

and Wei (2018) do not include knowledge sharing in their studies of the relationship between social media and civic engagement. This indicates the absence of a complete understanding of this relationship (Ahmad & Widén, 2018).

Such incomplete models do not foresee the possibility of participant disengagement, even though this could be a serious threat to civic engagement activities. This limitation of the literature will be addressed by the theoretical framework of this research, as it aims to bring the concept of knowledge sharing into the relationship between AI-driven social media and civic engagement, an argument supported by the literature (Cheung, et al., 2016). The central aspect of this theoretical framework is therefore, deeply involved with the two relationships: social media → knowledge sharing; and knowledge sharing → civic engagement. As a result, this should either enhance civic engagement or at the least maintain the status quo and prevent disengagement (Aslam, et al., 2014).

In addition, it is important to emphasize that social media is not an isolated concept in itself, but is supported by two important factors: bridging social capital and bonding social capital (Eidizadeh, et al., 2017). Therefore prior to discussing the relationships mentioned above (social media → knowledge sharing and knowledge sharing → civic engagement), it is necessary to understand the factors which underlie social media, including those which are theoretical (Crowder & Friess, 2013).

3.3 Social media, bonding social capital and bridging social capital

One of the main theories which can be applied to social media is that of social capital. While researchers have examined social media using other theories, including the social gratification theory (Glanville & Paxton., 2015) and the social network theory (Radil & Walther, 2019), the social capital theory has been found to support the concept of social media more effectively because of its focus on the involvement a network of people in civic engagement. In addition, civic engagement is concerned with structural thinking about potential changes in the

individual, social and civic spheres caused by digitalization (Gluckman & Allen, 2018). When social media is considered to be part of digital media and to affect civic engagement, the social capital theory may be the most likely to explain how social media could affect civic engagement in a structural way. However, using social capital theory to explain the relationship between AI-based social media and civic engagement has been effectively addressed in the literature (Ahmad & Widén, 2018).

Furthermore, while the focus of this research is civic engagement in an era when it is being shaped by AI and other new technologies, alongside social media and social capital, an important aspect that needs to be highlighted is that additional factors may be required to explain the relationship of social media, as a representation of social capital, with civic engagement (Checkoway & Aldana, 2013).

Although the literature identifies many factors that affect the relationship between social media and civic engagement – knowledge sharing; disinformation; misperceptions; political polarization; motivation, the digital divide; culturally and linguistically diverse (CALD) communities, the young and older people (ArneTech, 2019; Torney-Purta, 2018) – this research focuses solely on knowledge sharing, based on earlier research (Gooderham, et al., 2017). This aspect of the relationship between social media and knowledge sharing is discussed separately in **Section3.5**.

In addition, although there are different explanations of social capital theory (Yang, 2007), the one proposed by Inkpen and Tsang (2005) appears to be the most relevant to social media and its relationship to knowledge sharing and civic engagement. Inkpen and Tsang (2005:146) posit that "access to new sources of knowledge is one of the most important direct benefits of social capital", and deduce that assets that are embedded in networks of relationships both influence the conditions necessary for knowledge transfer and encourage cooperative behavior. This explanation of social capital theory shows that knowledge transfer

could imply knowledge sharing, and that cooperative behavior could imply civic engagement (Brandtzæg, et al., 2017). This argument is further strengthened by Kapucu (2008), who argues that social capital is a core value which leads to the sharing of communication as well as the giving and taking of resources, knowledge and trust. This in turn generates organizational values, innovation and advantage. If social capital theory is applied to social media, taking ChatBot in Facebook as an example, it can be seen that an exchange of resources, knowledge and trust happens between members of Facebook. For instance, when members engage in a civic activity, such as tree planting, where members of a community are requested to participate in a common cause, then participants in the activity will need to gain knowledge about the event over a period of time. In this example, people need to access the coordinators and resources, such as the brochure for the event, and develop trust and belief that the event has been organized by people who are genuinely interested in the activity to promote a common cause. ChatBot promises to be a social medium which will exemplify a social capital theory application that allows participants in an event to feel that the persons involved in that event are trustworthy, interact in a cost-effective manner and enable social interaction. It can thus be clearly seen that social media is a strong representation of social capital theory.

Furthermore, the literature on social capital shows that this concept is supported by two important dimensions: bridging and bonding between actors (Wen & Wei, 2018). For instance, in their study of the civic engagement of people in China in the context of genetically modified food, Wen and Wei (2018) argued that social capital is determined by bonding or bridging between the actors involved in civic engagement, an argument supported by Kapucu (2011). In the literature, bonding and bridging social capital have been shown to be determinants of social capital (e.g. Wen & Wei, 2018; Myeong & Seo, 2016). These arguments basically confirm that bonding and bridging social capital is linked to civic engagement. However, associating bridging and bonding social capital with the concept of social capital has been

criticized. For instance, Chang and Chuang (2011) argue that the terms "bridging" and "bonding" are conjectures when linked to social capital, and claim that 'social capital' is not a simple term, and that simpler terms such as 'membership' can represent this concept (DeJesus , 2018). That implies that it is necessary to understand whether using social capital and its representations as constructs in research is appropriate in all contexts. However, many researchers, including Kent et al. (2019), Schwadel and Stout (2012), and Turner (2011), have used social capital theory itself as the basis for using social capital and its associated representations, bridging and bonding social capital, as research constructs to address gaps in knowledge about interactions between people in networks. However, this has been inconclusive in various contexts. Considering, therefore, those research outcomes that have tried to establish the relationship between social capital in general and bridging and bonding social capital, this research argues that bridging and bonding social capital can be used as associates of social capital and as determinants of social capital using the models developed and tested by researchers such as Wen and Wei (2018) and Turner (2011).

In relation to this research, it is important to highlight that social capital theory lends support to the concepts of bonding and bridging social capital. The literature shows, essentially, that bonding and bridging social capital are both directly derived from social capital theory (Sato, 2013). For instance, bonding social capital is defined as bringing individuals together with others like them, while bonding indicates the bringing together of individuals with those who are different from them in terms of race, social class, education, age, religion, gender or ethnicity (Stout et al. 2012). While the former happens internally within groups, the latter occurs with outside each group (Turner, 2011). As mentioned above, if one applies the definition of social capital adopted for this research to social media, it can be seen that the definitions of both bonding and bridging can be directly linked to social media. For instance, social capital theory posits that social capital occurs in networks, and that bonding and bridging

take place within both homogeneous and heterogeneous networks (Kapucu, 2011; Adler & Kwon, 2002; Pantum, 2000). If this argument is applied to social media, such as ChatBot, it can be seen that people are part of networks both within and outside specific groups, which create bonding and bridging social capital. When bonding and bridging occur through ChatBot, social capital is created as "access to new sources of knowledge which is one of the most important direct benefits of social capital". Thus, it can be accepted that bridging and bonding as constructs determine social media, based on the theoretical and practical aspects outlined above (bridging social media → social media; bonding social media → social media).

However, in real life it is not clear whether every member in the network will be fully bonded to the social capital or bridged to it. Making people bond or bridge to the social capital is challenging, and it is necessary to understand to what extent people involved in civic engagement could be bonded or bridged to the social capital characterized by AI. If a relationship between bonding and bridging social capital is empirically identified, then it will be possible to predict to what extent the bonding and bridging take place. The hypotheses that emerge from this are:

H1: There is a significant and positive relationship between bonding capital and social capital.
H2: There is a significant and positive relationship between bridging capital and social capital.

Applying these arguments in the context of the current research into civic engagement, one can say that social capital, as represented by ChatBot, is determined by bridging and bonding between actors who are involved in civic engagement. In the absence of such bridging and bonding between a network of actors, it may be difficult for those actors to interact and share knowledge with each other, leading to a lack of meaningful civic engagement or even to disengagement. It should be mentioned here that the application of social capital theory to

understand how bridging and bonding social media characterized by artificial intelligence influences community engagement is not well addressed in the literature (Agrawal, et al., 2018). This research thus expands the application of social capital theory to understand the relationship between bridging and bonding social capital and AI-based social media (e.g. ChatBot) (Castrounis, 2017).

After discussing the relationship between social media and bridging and bonding social capital in the context of civic engagement, the next section focuses on the ways in which social media could be linked to civic engagement. As mentioned earlier, the literature shows that some research has directly linked social media to civic engagement, while some others have done so indirectly (Radil & Walther, 2019). This has created confusion and has not resulted in a universal understanding of the relationship between social media as social capital and civic engagement. To gain an understanding of this, this research uses the research outcomes of previous research including (Ahmed, 2019).

The bridging and bonding social capital is affecting social capital in one way direction, even if there are other dimensions such as trust but the two mentioned are the most major social capital drivers and stops there, therefore the author indicates that all of these can be in effecting social capital in varying degrees but not vice versa, social capital can be determined as an open close or bridging or bonding social capital to describe how strong or weak social capital is. bridging and bonding social capital is distinguish social networks and can be used as macro and micro-level evaluation (Lin,.2005)

An empirical study with evidence from two united Kingdom's organizations proofed that Bridging and bonding social capital affect the communities to understanding as its high importance element of social capital, understanding these elements will reflect on social capital remarkably, (bersnen,.e.t.) Scarbrough, 2004).

For some reason, the scientist still has not discovered how or why Social capital cannot control in some its own bridging nor banding social capital relations, but bridging and bonding social capital can participate highly in social capital rates.

For some reason, social capital needs trust from its elements and cant isolate or deny its institutions because they are an important element of the social capital and without these elements, there is no social capital exist or it will collapse because they are the communities can't deny its diversity and identity, but on the other hand, they can reject their and boycott their society belonging and to non-recognition, thankfully because of the freedom, can isolate in some extent participate and vote in some scenarios.

3.3.1. Similarities between social capital and social media

There are a lot of similarities between the concepts of social capital and social media. Both are defined in vastly different ways by different authors, both are conceptually vague, and both relate to social setting and social structure (Gosman & Botchwey, 2013). Both of them focus on the relationships between individuals. In addition, both involve exploring the nature of social interaction and exchange in a group or society. Both involve exploring the rationale for human behavior, particularly as it relates to social interaction (Wen & Wei, 2018). Social media and social capital are a dimension of social cohesion, cohesion tends to focus on the importance of strong coordinating institutions which places the emphasis on society as a whole rather than existing in social relationships.

3.3.2 Differences between social capital and social media

The main difference seems to be the starting point: social capital tends to start with the individual, social media tends to start with society. Social capital is commonly conceptualized as having a network component, i.e. involving social relationships between individuals. Social

capital is embedded in social relationships and is realized when people interact, the peoples in both social media and social capital are gathered for same concerned towards specific subject, in social media or social capital, but the differences is with the physical presence, there is organizations are controlling social media for their own interests, by creating social capital tends to behave towards their political goal(Sweetser, 2011), furthermore it will even sometime meant to effect societies' political activism progressions(Saffer et al., 2013) . Thus, social capital tends to have an individual focus, although most authors acknowledge or include the role of wider social setting in influencing the quality and nature of social interactions. Social media typically approaches the same issue from the group or societal level. It tends to focus on shared understandings such as solidarity, generalized trust, and widely help norms, values and attitudes (Inaba & Togawa , 2020).

3.4 Social capital and civic engagement

Putnam (2000) argues that social capital carries vast importance which allows resolving collective problems easily, increasing individual benefits by mutual cooperation, ensuring compliance with established norms and alleviating the individual burden in carrying out their missions. It establishes an environment where people are trustworthy, which leads to repeated interactions and creates a cost-effective environment in businesses and social transactions. Social capital constitutes the flow of information, facilitates achievement of goals, and in general contributes a big value to our life. Putnam illustrates the numerous cons of enhanced social capital as: influence in individual career success, enhancement of the pool of recruits for organizations, product innovation and resource exchange in firms, reduced turnover rates, strengthened supply relations, networking, organizational entrepreneurship, etc. Social capital is one of the core values which have a positive effect on individual as well as organizational

effectiveness. It leads to sharing of communication; exchange of resources, knowledge, and trust which all contribute to improved organizational advantage, innovation, and value.

Two debates are often found in the literature on civic engagement. These debates are summarized in the question: "Is CE an individual or community-level phenomenon?" (Lin, 2001). Putnam (2000) claims that civic engagement constitutes a community-level phenomenon. In addition, Bourdieu (2001) asserts that it is an individual phenomenon. This is because individuals possess various levels of civic engagement in accordance with their personal virtues. However, there is no doubt that whether the engagement is intended to benefit the individual or the community, it is generally established by an individual. As Mascherini, Saltelli and Vidoni (2007) suggest, civic engagement is a form of engagement in which individuals participate, which is geared towards their private interests. Social engagement, however, is the participation of individuals in organizations that aim to serve the community.
The introduction of the internet, and particularly social media platforms, has led to massive changes in people's connections and relationships. Social media or social network sites (SNSs), which appear in many different forms including Facebook, YouTube, Twitter, Flickr and LinkedIn, are referred to as "web-based services that allow individuals to (1) construct a public or semi-public profiles within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system" (Ellison, Steinfield, & Lampe, 2010). Most, if not all, SNSs have close structural similarities, and may basically be categorized as community sites with profiles, friends and comments (Boyd, 2008). It can be assumed that the online context of social networks is very similar to a community of relationships, even though it is based on an individual. This can be attributed to the fact that social networks allow individuals to establish their own social connections through online interaction. This means that social networks

encourage individual participation in terms of providing feedback, sharing data and communicating in other ways through the web. As a consequence, social media plays a critical role in improving the means by which individuals communicate with each other and with organizations. These social networks have also proved to be instrumental in establishing networks of relationships with the public, and supporting involvement and engagement. These unique features of social networks make them more effective ways for organizations to generate social capital (Boukes, 2019).

Since social capital is focused on establishing and maintaining relationships between an organization and individuals, and between different individuals, the concepts of social capital and civic engagement give a deeper meaning to relationships for the community and society at large as well as for individuals and organizations. Researchers in the field of social capital have started to investigate the role of public relations in social capital (Zhang & Seltzer, 2010), but the concepts of social capital and civic engagement have not often been applied to the field of public relations.

Previous research, including that which concentrates on the role of public relations in establishing communities, such as Kruckeberg and Starck's (1988) 'community building theory' and the work of Hallahan (2004), present the idea of community as a basis for public relations. These studies demonstrated that the essential role of public relations practitioners is to maintain a sense of community and improve the entire social context. Many studies of social capital in public relations have presented a range of evidence for the gains made from social capital. Hazelton and Kennan (2000) investigated the influence of social capital on the finances of institutions. These gains included minimized costs of operations, high quality and quantity production, and high levels of customer satisfaction.

Researchers have explored the three major dimensions of social capital that are most important for public relations: the structural dimension, communication dimension and

relational dimension. Researchers have debated whether communication is not only the basis of social capital, but also represents the "mechanism in which the available stock of social capital can be accessed and expended to further various organizational goals and objectives" (Ellison, Steinfield, & Lampe, 2010). It has been demonstrated that theorizing social capital is very significant in public relations. It has been argued that social capital can be possessed through networks of trust and reciprocity between its various publics, and that communication with an organization's publics is vital not only for its own survival but also for its legitimacy and reputation (Sommerfeldt, 2012).

In the current period of globalization and revolutions in information and technology, people tend to be more interconnected. However, they are often distanced from the policy decisions that affect their lives. It is clear that most governments do not possess the ability or resources necessary to address all of the political, economic and social issues in society, however advanced that society is. It is therefore vital to engage individual citizens in the improvement of society. In this respect, civic engagement is one proven way where citizens can join together to help develop a better future for their community (Ehrlich, 2000).

Civic engagement represents a wide range of activities where individuals share in both formal and informal political practices, to serve the needs of the community. Civic engagement thus seeks to improve and enhance the quality of life for all individuals, groups and communities (Cho, et al., 2020).

Civic engagement provides both individuals and governments with chances to change communities for the better. Through active civic engagement, citizens are able to recognize and address the different social challenges facing the community. In this respect, civic-minded people see themselves as being parts or members of a larger entity, while their collective responsibility and sense of belonging drive them to participate in actions which improve society. With or without government assistance, they approach problems, work collectively

and find solutions to them. In addition, civic engagement helps in preparations for, and responses to, emergencies and disasters that take place in the community and the whole country (Pattie, et al., 2003).

Civic engagement provides the community with precious social capital, which underlies all the positive activities and effects of the interactions between individuals in the community. This social capital benefits many fields such as education, increased levels of safety within the society, and graduate employment, while also resulting in decreased crime, higher levels of literacy and greater health and socioeconomic equality. The level of civic engagement in the various civic activities determines whether the social capital of the community is beneficial (Wellman, et al., 2002).

In general, civic engagement is a strategy which targets the challenges found in society and the nation as a whole. For instance, it strengthens the performance of schools in the community and tackles the problem of people dropping out from education. This undoubtedly improves the level of education in communities with high levels of effective civic engagement, and also in turn benefits education in the whole country, as it prepares students to willingly serve their country (Firat , 2014).

Civic engagement also helps to improve energy competence, conserving the available energy sources in the community. This safeguards the environment and its natural resources, which, in turn, refines community health care. In addition, it increases economic opportunities in low-income areas, offering new job opportunities to the unemployed. Thus, a nation's social capital can guarantee its future progress (Mainsah, et al., 2016).

Social capital can be enhanced by internet-based social networks. These social networks provide different opportunities for individuals to become socially engaged and to participate positively with their community. Social media, including YouTube, Facebook and Twitter, provide individuals with platforms which enable them to volunteer in civic

engagement activities and initiatives (Nielson, 2010). Two popular examples in which social networks allowed individuals to contribute to civic engagement activities are the 2011 "Occupy" movement and the "Arab Spring" movement in the Middle East. In both examples, social media platforms were used to organize protests and gatherings (Sommerfeldt, 2012).

The relationship between social capital and civic engagement is debatable, and it can be strengthened or weakened by various factors and variables. There is no doubt that an increased dependence on social media platforms is a major contributor to this relationship. Public relations established through the social networks has helped build of social capital, employing trust and values, which are components of civic engagement and benefit the entire community.

The following hypothesis can therefore be proposed for the purposes of the present research.

H3: There is a significant and positive relationship between social capital and civic engagement.

Extending this argument to research which involves social capital characterized by AI (e.g. ChatBot), sharing knowledge of AI through ChatBot and applying social capital characterized by AI to civic engagement could lead to the development of a research model predicting the extent of the influence of social capital characterized by AI on civic engagement (Castrounis, 2017). It can also be seen that civic engagement itself does not function in isolation but also has a bearing on the cultural construct affecting the members involved. For instance, any civic engagement activity which involves people from different cultures will be affected by the cultural background of the various participants (Crowder & Friess, 2013). This is often seen in international organizations such as the Society of Engineers, whose participating members belong to different cultures, so that the civic engagement of those societies could be influenced by the cultural backgrounds of those participants. In particular, a multi-cultural environment

could potentially disturb civic engagement, leading to low engagement by the participants (Habeeb, 2017). The next section therefore deals with the relationship between specific cultural factors which are identified in the literature and civic engagement which is determined by social capital characterized by AI, to determine how these factors impact civic engagement.

3.5 The relationship between social capital and knowledge sharing

It was argued in the previous sections that social media as a representation of social capital can influence civic engagement (e.g. Brenne (2016)). However, it remains unclear how social media characterized by AI affects civic engagement. In fact, Brenne (2016) argues that social media as a concept fails in the public sphere. This is a serious point that merits attention. The reason Brenne (2016) gives for this observation is the continuous surveillance and examination of public opinion that takes place on social media. Brenne (2016) strongly recommends investigation of this area, because of the exposure of individuals to information on social networks, resulting in potential harm to them, and then to disengagement. Although this is not well understood, it can be argued that this impact of social media on individual actors or network of actors could be directly linked to knowledge sharing on social media (social capital), because knowledge sharing, knowledge transfer and knowledge creation all occur on social media (Qi & Leung, 2015; Zaffar & Ghazawneh, 2012). This leads to the important issue of the relationship between the social media as a representation of social capital and knowledge sharing. This topic is still not fully understood in the literature, in an era where social media is moving towards the introduction of AI (Alsharo, et al., 2017).

Earlier sections have discussed social media and its relationship with civic engagement. It has also been shown that research into social media and its relationship to civic engagement lacks clarity and has produced mixed results. For instance, it was demonstrated that the research of Wen and Wei (2018) has limitations concerning the direct relationship between social media and civic engagement. Similarly, the outcomes of Gooderham et al. (2011). although providing

a strong basis for linking social capital to knowledge sharing, do not envisage the possibility of technological advances, such as AI, occurring quickly, and thus affecting social capital and its relationship to knowledge sharing. It is widely agreed that the introduction of any new technology can affect most of society and AI is no exception to this. A method is required through which citizens can understand the new technology and learn how to use it. One possible method is knowledge sharing. These arguments provide a strong basis for further investigations which will explain how and to what extent social capital, represented by social media characterized by AI, can be disseminated through knowledge sharing to participants in civic engagement. The following discussion thus focuses on knowledge sharing, its relationship with social media and its effect on civic engagement, the core issue of this research (Busalim, 2016).

The literature review shows that knowledge sharing has been defined in different ways, for instance, Eidizadeh et al., (2017) define it as a process in which individuals exchange their knowledge mutually and also create new knowledge. According to Lee (2018), knowledge sharing is part of knowledge management, but is only a means to an end rather than the end itself. Flinchbaugh et al. (2016) argue that it involves sharing knowledge and information between the members of an organization, so that those members can exploit the knowledge-based resources and capitalize on them (Jackson et al. 2006; Cabrera & Cabrera 2005; Davenport & Prusak 2000). These definitions can be applied to the concept of knowledge sharing and its relationship to social media and civic engagement, the topics of this research.

For instance, if civic engagement requires members to use AI, then knowledge and information about AI must share between them so that they can do so. Once this AI knowledge has been shared between the members, they will need to create new knowledge through using AI to innovate. In community engagement activities, including those related to education or areas where the transparency of decisions needs to be increased, social media and knowledge transfer can play a vital role in creating awareness via discussion forums and encouraging

participation. In such situations, knowledge sharing becomes a vital link with the social media with advanced features like ChatBot (which involves AI), while knowledge sharing could enable wider participation by people who could also create knowledge (Torney-Purta, 2018). It is also not guaranteed that everyone will accept the use of technologically enhanced social media and will participate in either knowledge sharing or gaining knowledge through sharing.

It is possible that some will reject the concept and application of AI, because of perceived complexities associated with it and the possibility that they could disengage from civic engagement activities. In such a situation, it is important to find a mechanism that will make it clear to what extent social capital characterized by AI is accepted by people involved in community engagement and how far knowledge sharing can take its place. These questions still need to be answered (Aparna & Ramachandran, 2019).

The literature demonstrates that theories of social capital and social exchange have been widely used as theoretical support for the concept of knowledge sharing (e.g. Tulin, et al., 2018; Qi & Leung, 2015). Social capital theory explains the importance of social networks in influencing knowledge processes (Parise, 2009). According to Ahmed et al. (2018), models from social capital theory are the most widely used in research related to knowledge sharing and social behavior. However, unlike social exchange theory, which explains social-related determinant factors such as perceived reciprocal benefits and perceived enjoyment, social capital only explains the importance of social networks in influencing knowledge processes (e.g. Arief et al. 2018; Qi & Leung, 2015). In order to understand the knowledge-sharing process that is determined by social capital, this research therefore posits that a combination of social capital and social exchange theories needs to be used, in order to understand how the concept of knowledge sharing is influenced by social media. For instance, if there is a need to understand and build knowledge in people involved in civic engagement about AI (e.g. societies), then there is also a need to build knowledge through social networks (e.g. social

media). This knowledge sharing or transfer process then builds social capital. This is the essence of social capital theory. However, if one has to engage with the knowledge-sharing process, there will need to be a perception of the reciprocal benefits which accrue to those involved in civic engagement through social media. This is explained by social exchange theory (Brown, et al., 2016). This joint application of social capital theory and social exchange theory, to understand how knowledge sharing takes place in communities which are engaged in civic matters, is a new way of expanding the utility of these two theories in research into civic engagement influenced by AI-based social media (Alsharo, et al., 2017). This implies that if individual perceptions of the development of social capital characterized by AI are more positive, then more knowledge sharing will take place between participants. The converse will also be the case. However, in a real-life situation in which a community is engaged in civic activities, sharing knowledge about social capital that is characterized by AI always presents challenges, and there will always be people who either accept or reject it or be concerned about the its potential influence on knowledge sharing (Behringer & Sassenberg, 2015). This area is not well understood, as there is no model or formula that can predict the extent to which a person will accept or reject technologically advanced social capital as a knowledge-sharing forum which considers the developments in social capital which involve new technologies such as AI. If created, an empirical relationship between social capital and knowledge sharing could help predict the extent to which people involved in civic activities will perceive that social capital can be useful in sharing knowledge about the concept of newly developed and technologically advanced social capital, and apply it to civic engagement. In this context, this study uses the research outcomes produced by Gooderham et al. (2011), and expands the concept of the relationship between social capital and knowledge sharing, by creating a direct relationship between social capital and knowledge sharing in the context of civic engagement (Zhu, 2016). It is assumed that the sharing of knowledge about social capital characterized by

AI will strengthen civic engagement and reduce disengagement. The hypothesis that emerges from the previous discussion, in which social media can be seen to influence knowledge sharing (social media → knowledge sharing) is as follows:

H4: There is a significant and positive relationship between social capital and knowledge sharing.

If this hypothesis is valid, then ChatBot, as an AI-based social media tool, could enable greater sharing of knowledge about the concept of AI between members, and could also enable its application as a tool which generates reciprocal benefits for those involved in civic engagement (Castells, 2013). Testing this hypothesis could reveal the actual situation and contribute to knowledge. After understanding the relationship between social media and knowledge sharing, the next section will focus on the relationship between knowledge sharing and civic engagement, to determine whether knowledge sharing using the AI-based social media (e.g. ChatBot) leads to better civic engagement (Bilgihan, et al., 2016).

3.6 The relationship between knowledge sharing and civic engagement

From the literature we can see that civic engagement can be supported by knowledge sharing. Studies including those of Gomes et al. (2017), Wen and Wei (2018), Razmerita et al. (2016) and Zhu (2016) posit that knowledge drives civic engagement. A similar argument is made by Deming (2017). It is important to know what kind of knowledge is to be shared between people involved in civic engagement. The nature of this knowledge broadly indicates their view of AI, its utility and the application of AI knowledge in civic engagement, which are the focus of this research. Furthermore, while discussing the concept of knowledge sharing, it is not clear from the literature, for example Ahmad and Widén (2018), how far knowledge sharing affects civic engagement, to what extent knowledge sharing about social capital can take place in a community of people engaged in civic activities or what is the most suitable mechanism to achieve it. For instance, the research outcome of Chong et al. (2014) indicates that knowledge

transfer takes place through diffusion. However, they do not discuss the possibility of antecedents affecting the construct of knowledge. Asdourian and Zimmerli (2018) define knowledge as information contained in documents, internal exchanges, web pages which include core information and links to tutorials for the development of software and open data formats. They directly link knowledge as a construct to civic engagement and argue that knowledge diffuses and is important for civic engagement. However, they do not state whether this knowledge diffusion occurs because of antecedents, and this makes their research findings incomplete. Similarly, in the conceptual model developed by Rastegar and Hady (2017), it is argued that knowledge sharing is an important variable which enables transfer or sharing of knowledge about social capital and also mediates between social capital and organizational performance. (This could also imply civic engagement but it is not made clear). In their research, Rastegar and Hady (2017) show that social capital acts as an independent variable that drives organizational performance mediated by knowledge sharing. (They define knowledge sharing as a set of behaviors which lead to information exchange or helping others). It is not clear from their work whether organizational performance can be considered synonymous with civic engagement or whether it could be directly affected by knowledge as a construct.

It is clear that knowledge and knowledge sharing affect civic engagement and organizational performance. However, it is not clear to what extent knowledge sharing will take place between those involved in civic engagement if they use social capital with advanced technological features. This needs to be determined in order to predict the extent to which knowledge sharing could take place across a social network in the context of civic engagement. This has not been clearly addressed in the literature, such as in the research outcomes of Asdourian and Zimmerli (2018), and Rastegar and Hady (2017). This research aims to remedy this by suggesting a link with knowledge sharing about social capital characterized by AI. This

will be supported by the models of Asdourian and Zimmerli (2018), and Rastegar and Hady (2017). It will be argued that social capital represented by AI-based social media (e.g. ChatBot) influences civic engagement through knowledge sharing between participants in civic engagement and the subsequent application of AI in civic engagement. A hypothesis has already been formulated which indicates that: social capital → knowledge sharing. Using the argument above to further extend this assumption, it can be proposed that knowledge sharing influences civic engagement (knowledge sharing → civic engagement) or reduces disengagement.

To support this assumption, the literature suggests the use of theories such as social exchange theory (knowledge sharing); social capital theory (knowledge sharing and civic engagement); sociological theory to indicate interactions between people (civic engagement) (Aggestam, 2015); and civic engagement theory (Pattie, et al., 2003). The theory of civic engagement can be further classified into three theories: rational choice, social capital and civic voluntarism (Pattie & Seyd, 2003). Of these three, social capital theory has already been shown to be applicable to civic engagement and knowledge sharing. One version of the social capital theory states that involvement in the activities of local organizations helps foster a sense of trust in others (Putnam, 2000). The rational choice theory explains how economically rational actors maximize benefit from an activity while minimizing cost. If this theory is applied to civic engagement, then it can be said that civic engagement will occur if the cost of involvement in civic engagement is low and the benefit of successful action is high (Ahmed, 2019). It is therefore clear that explaining the relationship between knowledge sharing and civic engagement could involve a combination of theories relating to social exchange, rational choice and social capital. For instance, when an educational programmer concerning AI and its use in social media is organized for a community, then it is important for the people involved in civic engagement to develop a sense of trust in the beneficiaries of the programmer as well as in

their colleagues. In addition, the organizers and the beneficiaries should both experience minimum cost and maximum benefit from the outcome (Lam, et al., 2016). It can therefore be seen that theories of social capital and rational choice are both involved. As has already been explained, social exchange theory supports the possibility of a relationship between knowledge sharing and civic engagement.

The discussions above show that knowledge sharing is related to civic engagement. In this relationship, knowledge sharing affects civic engagement as a variable that mediates between social capital and civic engagement. This research proposes a further expansion of the concepts presented in the conceptual model of Rastegar and Hady (2017), so that civic engagement is included in place of organizational performance. This is supported by the model of Chiu et al. (2016). This leads to the following hypothesis:

H4: The impact of social capital on civic engagement is significantly and positively mediated by knowledge sharing.

3.7 The relationship between trust, values and civic engagement

Civic engagement enables people to undertake collective actions in order to work on issues in the public space. They practice a type of democracy and become a positive part of the community in which they live (Checkoway & Aldana, 2013). There are different forms of civic engagement, including individual volunteering, social engagement, organizational involvement and government work such as participation in elections. Civic engagement can include actions that deal with problems through personal work, community work or work involving not-for-profit organizations. Many people participate in these activities because their sense of responsibility requires them to engage actively in their community (Ekman & Amnå, 2012).

Because of the increasing importance of civic engagement to communities, reform was undertaken at the beginning of the 21st century to improve civic engagement practice. It attempted to connect civic engagement to the latest improvements in technology and information. This led to the combination of civic engagement and artificial intelligence known as "civic intelligence" (Schuler, 2019).

Research shows that AI can help people to introduce solutions, communicate with each other more effectively, obtain data for planning, and focus on global community issues. New research has suggested ways in which AI can help safety, health and city governance. This research indicates that AI can be effectively used in society, but also that researchers, policymakers, community members and technology companies need to work together to improve it. In other words, coordinated civic intelligence is required to make artificial intelligence work (Boukes, 2019).

Trust and values are the most significant components of civic engagement. There is no doubt that civic engagement gains much of its effectiveness and significance through trust. Researchers claim that trust in the media, both traditional and digital, is a major source of effective civic engagement. Most important is trust in digital platforms (e.g. social media) and the internet in general, as they are open, transparent and neutral means of communication. If trust in these media is absent, civic engagement will not take place effectively (Richard & Gogg, 2005).

As a popular social capital theory states, civic engagement should produce generalized trust between citizens. One of the most widely accepted definitions of trust calls it "the perceived likelihood that others at worst, will not knowingly or willingly do you harm, and at best, will act in your interests" (Glanville & Paxton., 2015). The form known as 'generalized trust' has been described as the core value or belief that other people can and should be trusted.

In the light of this, trust is referred to here as ‘social trust’, a term which refers to the fact that trust exists between individuals in a social context. Many factors contribute to the creation and development of this trust. These factors include family backgrounds, in addition to the conditions experienced in late adolescence and early adulthood. These two stages are actually critical in developing trust. Falling levels of trust are caused by many factors, including early childhood experiences, as well as the social learning perspective which assumes that people permanently adjust their social trust through significant interactions with people in different contexts (Janmaat, 2019).

It has been suggested that an absence or shortage of trust is a major barrier to making civic life more effective and inclusive. However, most researchers recognized civic engagement as being actively involved and present in one’s society despite some distrust of local communities and governments.

There is general agreement amongst contemporary researchers that trust is a significant component in the enhancement of civic engagement. This significance is actually attributed to social and political factors (Cho, et al., 2020). Unusually for the increasingly fragmented and specialized academic world, the interest in trust extends across many different disciplines, including sociology, political science, economics, psychology, history, anthropology, political theory and philosophy, and management and organization studies.

Researchers agree that social trust represents a perception of the honesty, integrity and reliability of others. In other words, it represents “faith in a human being” (Singha, 2019). Though it might seem easy to establish an idea about people, it is not so simple to identify who to trust, and why one person should be trusted, but not another. There is no one level of trust in existence. Levels of trust varied between countries and even in different parts of the same country, while trust can be also associated with monetary and non- monetary issues (Fukuyama, 1995).

The other significant component of civic engagement is values. Research, such as that of Firat (2014), has concluded that values represent potentially significant mechanisms through which media cultivates ideology. This is actually in line with some other research which indicates that values have been closely linked for many years to social structure, culture and social behavior (Anon., 2004). It is claimed that values are cognitive structures that are linked to favored states and behavior, but are more abstract than attitudes. Research shows that values are formed via social structural conditions such as social class, occupation and cultural world-view. Values are undoubtedly a core part of the self (Ester & Vinken , 2003), as well as being great motivators of action. Structural and cultural forces are responsible for forming values. Values also influence individual judgement and behavior, and thus are plausible mediators of the relationship between media usage and civic engagement. Existing research claims that social media use is an important predictor of an individual's values (Swigger, 2013).

Values are the other component of civic engagement. It is agreed that values represent the "mental representations of three universal necessities for human existence. These necessities include the needs of individuals as biological organisms; requisites of coordinated social interaction; and survival and welfare need of groups" (Levine, 2007). They can be classified in four 'value domains': openness to change; self-transcendence; self-enhancement; and conservation (Schwartz & Boehnke, 2004). These domains can further be grouped into two bipolar dimensions: openness to change vs. conservation; and self-transcendence vs. self-enhancement.

When values are related to social context and civic engagement activities, researchers identify six values of particular importance: service; social justice; the dignity and worth of the person, importance of human relationships; integrity; and competence (Chow & Chan, 2008). Service is the core value concerned with handling social diseases and supporting other people. It seems to be the primary goal for all those involved in civic engagement, and is known to be

the value from which the other civic engagement values derive. Social workers involved in civic engagement usually elevate the requirements of others above their own personal interests.

They are always keen to make use of their skills and knowledge to help others. People involved in civic engagement are always ready to volunteer their time as well as their efforts to help other people (Busalim, 2016).

The second value that is highly significant in civic engagement is social justice. Those interested in CE advocate on behalf of oppressed people, the poor, the voiceless and many other types of people who cannot do so for themselves. They focus on issues including poverty, homelessness, discrimination, harassment and other forms of injustice.

The third value is dignity and worth of the person. It is important to admit that individuals differ from each other in their cultural and social values. Those who are interested in civic engagement are aware of those differences, treating each person with dignity and respect and promoting the ability of their clients to address their own needs and improve their personal situations (Chang & Chuang, 2011).

The fourth value is the importance of human relationships. People who are interested in civic engagement connect those who require support with organizations and individuals who can support them. They recognize that facilitating human relationships can be a useful vehicle for creating change.

The fifth value, integrity, is also critical. It plays a great role in facilitating relationships so that people's lives are improved. Participants in civic engagement must be trustworthy at all times, recognizing the mission, values, ethical principles and standards of their profession. When they act in an honest and responsible manner, they become more likely to serve those in need effectively (Abbott & Reilly, 2019).

The sixth and last value of civic engagement is competence. People who are active in civic engagement usually hold an undergraduate or postgraduate degree in social work. However, they also learn from their career experiences (Janmaat, 2019).

Thus, trust and values have been shown to affect civic engagement. The hypothesis is further split into two sub-hypotheses:

H5: There is a significant and positive relationship between trust and civic engagement.
H6: There is a significant and positive relationship between values and civic engagement.

3.8 Impact of cultural factors on civic engagement

It is generally agreed that culture has an important effect on civic engagement (Mainsah, et al., 2016). According to Mainsah et al. (2016), the culture gap also has a major impact on civic engagement. They argue that the advent of social media has made it much more difficult for civic organizations to exploit the potential of the younger generation and that cultural differences between the networked culture of today's youth and the top-down approach of civic organizations has created a cultural gap (Mainsah et al. 2016). Anheier et al. (2016) discuss the role of culture in civic engagement. They argue that, while culture as a factor is generally agreed to influence civic engagement, the relationship of other factors apart from culture to civic engagement is still not understood. In addition, new internet technology has been believed by some to have affected cultural values (Pippa Norris, 2001) and civic engagement, although it complements social capital (Wellman, et al., 2002), which could thwart the aim of advancing technological concepts. In fact, some believe that digital-media-based activities can seriously affect culture and lead to a decline in civic engagement (as in the case of political participation)

(Chiu, et al., 2016). These examples clearly show that culture as a factor affects civic engagement, and that technological advances such as social media can create a cultural gap.

This study therefore argues that, in association with social capital characterized by AI, culture can influence civic engagement. It further seeks to determine whether the association of social capital and culture leads to enhanced civic engagement, maintains the status quo or leads to disengagement. This position was taken by the researcher because the literature shows that civic engagement can involve people whose age, ethnicity, experience, culture and background can vary greatly. Hence, in an era where social capital must constantly evolve, due to the changing environment and culture (Abbott & Reilly, 2019), its developing impact on civic engagement needs to be understood. Treating social capital and culture as independent variables which are affected by the changing technological environment but determine the civic engagement, it is therefore possible to posit that culture influences civic engagement.

Turning to the theoretical support for this argument, culture is defined in multiple ways in the literature, while some theories have been applied by some researchers, such as Stefie (2009), who used the theory of action to explain the relationship between culture and civic engagement. Other theories, definitions and explanations are found in the literature. For instance, Hofestede defines culture as "the collective programming of the mind which distinguishes the members of one group or society from those of another" (Hofestede, 1984).

In contrast, cultural theory argues that members of groups with a common outlook are likely to impose order on reality in particular ways (Ahmed, 2019). Further cultural theory explains the relational patterns and pressures that influence how and what people think. This theory also identifies the existence of social structures and the styles of thought, ideas and ideologies that exist alongside social structure. In addition, the theory specifies institutional types and the attitudes that accompany them (Ripberger, et al., 2014). Elsewhere, the literature discusses popular culture, defining it as the process through which people try to construct

meanings, understanding and identities throughout the world (Tian, et al., 2018). In terms of the theory of action, Stern and Seifert (2009) state that it affects civic engagement and can be explained using three approaches: didactic, discursive and ecological. The didactic approach indicates the capacity to persuade; when this concept is applied to civic engagement and culture, specific outcomes are produced through dialogue. The discursive approach deals with deliberations, which could involve public discussions about the relationship between culture and civic engagement. Finally, the ecological approach links civic engagement and culture to the social environment (Stern & Seifert, 2009).

The relationship between culture and civic engagement has also been defined by the access, interaction and participation (AIP) model. 'Access' refers to the presence of technology, content, people and organizations. 'Interaction' describes socio-communicative relationships, while 'participation' is attributed to power and equalized power-relations within decision-making (Nico, 2012). Finally, the Civic Culture Framework identifies five elements of civic culture which comprise a suitable environment for agency: knowledge, values, trust, spaces, practices and identities (Dahlgren, 2009). Using this framework, it is possible to describe civic engagement and represent it using the five factors.

However, these theories do not explain the relationship between culture and civic engagement in an environment where civic engagement is affected by social media, social capital and culture characterized by AI. While literature talks about the declining interest in civic engagement in today's youth, it does not explain how this can be halted or improved, so that young people become more positive towards civic engagement. This section will make use of action theory and the Civic Culture Framework. Action theory provides a didactic, discursive and environmental basis with which to describe the relationship between civic engagement and culture, while the Civic Culture Framework suggests factors which explain civic engagement.

The discussions above show that culture is an important influence on civic engagement which can reduce disengagement.

This theory attempts for the first time to expand the application of these theories to explain how social media culture, as social capital characterized by AI, will enhance community engagement or reduce disengagement. While applying the Civic Culture Framework, the research has chosen two factors, trust and values, to represent civic engagement as a concept. Dahlgren (2009) identifies five factors – knowledge, trust, practice, space and value – which affect civic engagement, and explains that knowledge, trust and values represent dimensions of civic culture. Of these three, knowledge has already been represented as part of the knowledge-sharing construct of this research. It is expected that the greater the trust in a social media culture that is characterized by AI, the greater will be the perception of its value, and the lower will be people's participation in civic engagement.

3.9 Theoretical framework

Based on the discussions above, the following theoretical framework introduces the network of relationships that the researcher plans to investigate in the present study. It will identify the main components of the independent variable and the dependent variable. Bonding capital and bridging capital both have arrows directed towards social capital, as the researcher is investigating the impact of both on social capital. This is introduced through H1 and H2. In addition, knowledge sharing is the mediating variable, as explained in Chapters 2 and 3. The mediating impact of knowledge sharing between social capital and civic engagement is explored in H4. Trust and values represent the main components of civic engagement, so the researcher aims to identify their impact on civic engagement. This is why two arrows point from trust and values towards civic engagement. These relationships are discussed in H5 and H6. As knowledge sharing is being used as a mediating variable, the impact of social capital on civic engagement is explored indirectly in H4, which is in the presence (mediation) of

knowledge sharing, or directly between social capital and civic engagement H3, to find the difference in the absence of knowledge sharing. This is the major concern of the entire research.

The theoretical framework can be represented pictorially as follows:

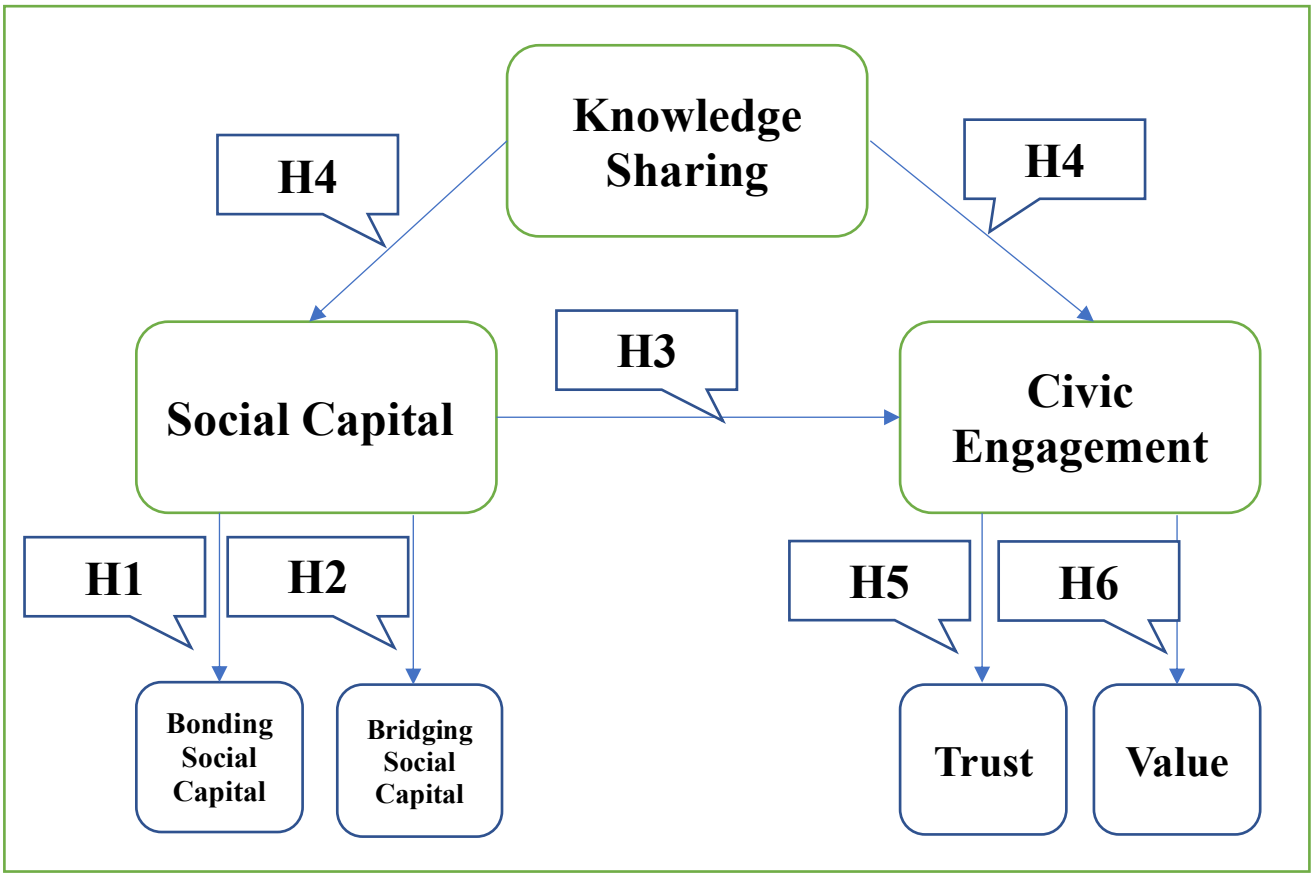


Figure 3.1 The theoretical framework

Based on the literature review and the exploration of the available theories about the relationships between the research constructs, the researcher assumes that the independent variable for the present research is social capital. Social capital is found through the literature to be made up of two constructs which are bonding social capital and bridging social capital (Bolino, et al., 2002). Based on this, the researcher proposes the first and the second hypotheses which are (**H1: There is a significant and positive relationship between bonding capital and social capital) and (H2: There is a significant and positive relationship between bridging capital and social capital).** The outcomes of previous studies about social capital,

knowledge sharing, civic engagement ensured that social capital is responsible for making changes in knowledge sharing (Abbott & Reilly, 2019). Social capital is also responsible for making changes in civic engagement which is the dependent variable (Gosman & Botchwey, 2013). This is the reason that makes the researcher (Ahmad & Widén, 2018). This is the reason that makes the researcher propose the third hypothesis (**H3: There is a significant and positive relationship between social capital and civic engagement).** Knowledge sharing is employed in the present research as the mediating variable. This is established on the findings of (Aslam, et al., 2014) that ensure that knowledge sharing is affected by social capital. So, it can be proposed that (**H4: There is a significant and positive relationship between social capital and knowledge sharing).** It also impacts civic engagement in accordance to the results of (Eidizadeh, et al., 2017)**.** This guides the researcher to propose **(H4: The impact of social capital on civic engagement is significantly and positively mediated by knowledge sharing).** Based on the discussions presented by (Salinas, et al., 2018), trust and values are major components of civic engagement. They impact it and get impacted by it. This is the reason that the researcher proposes the last two hypotheses (**H5: There is a significant and positive relationship between trust and civic engagement) & (H6: There is a significant and positive relationship between values and civic engagement).**

Based on the researcher recognition of the variables and the sub-variables that make up the present discussion, the researcher designed three research questions that can be main pillars for the conclusions that are to be reached.

RQ1: *To what extent are bonding and bridging social capital associated with social media?*

RQ2: *To what extent can knowledge sharing mediate the relationship between social capital and civic engagement?*

RQ3*: To what extent is social capital in terms of trust associated with civic engagement?*

RQ4*: To what extent is social capital in terms of values associated with civic engagement?*

Likewise, the research objectives are derived from the theoretical framework.

1. To study the concepts of social capital, knowledge sharing and civic engagement and their representations, through the literature review.
2. To identify the relationship between social capital and civic engagement by studying the relevant concepts, models and theories.
3. To develop a theoretical framework and appropriate methodology to answer the research questions.
4. To formulate the necessary hypotheses and verify those hypotheses to answer the research questions and determine whether the aim and objectives have been achieved or not.

3.10 Statement of the research problem

Civic engagement is facing many challenges in the modern era. In particular, young people, who are now growing up in an era of social media, do not seem to be interested in civic engagement activities. This is posing problems to many relevant organizations. Another problem is that participants in civic activities are challenged by advances in technology such as AI-based social media. They face the daunting task of learning to use modern methods of civic engagement. If they are unable to, they may lose interest in civic engagement and then disengage from it. This shows that civic engagement could be threatened by a potential lack of volunteers, which in turn could leave a gap in society affecting people who currently benefit from civic activities. This research has therefore identified the concept of civic engagement as being one that is threatened by AI-based social media (representing social capital), and addresses this threat. The research problems that will be addressed are:

RQ1: *To what extent are bonding and bridging social capital associated with social media?*

RQ2: *To what extent can knowledge sharing mediate the relationship between social capital and civic engagement?*

RQ3*: To what extent is social capital in terms of trust associated with civic engagement?*

RQ4*: To what extent is social capital in terms of values associated with civic engagement?*

Aim: To contribute to the understanding of the relationship between social capital and civic engagement in the absence and presence of knowledge sharing.

Objectives

This aim can be divided into the following objectives.

5. To study the concepts of social capital, knowledge sharing and civic engagement and their representations, through the literature review.
6. To identify the relationship between social capital and civic engagement by studying the relevant concepts, models and theories.
7. To develop a theoretical framework and appropriate methodology to answer the research questions.
8. To formulate the necessary hypotheses and verify those hypotheses to answer the research questions and determine whether the aim and objectives have been achieved or not.

Chapter Four: Research Methodology

4.0 Introduction

The main purpose of this chapter is to present the research methodology, as well as the rationale behind each decision in terms of the methodology. The selected methods are expected to assist in answering the research questions stated in Section 1.3. In order to assess the relationship between social capital, knowledge sharing and civic engagement in the Bahraini community, the researcher conducted in-depth investigations to determine which methods would be most effective. Both qualitative and quantitative approaches are applicable for the purpose of this research; however, a quantitative approach seems most consistent with the key objective of the present research, which is to understand the impact of social capital on civic engagement through knowledge sharing in the context of AI.

The chapter begins with an introduction for the research setting. In which a hint is provided about the kingdom of Bahrain in which the research is applied. This is followed by a presentation for the research design. The selected research design needed to be consistent with the chosen research philosophy perspectives, especially in terms of the areas of ontology, epistemology and axiology that are related to the subject of research: "the relationship between social capital and civic engagement in the presence and absence of knowledge sharing".

Research design can be defined as "the set of methods and procedures used in collecting and analyzing measures of the variables specified in the problem research". In other words, the design of the research defines the study type (descriptive, correlational, semi-experimental, experimental, review, meta-analytic), research problem, hypotheses, independent and dependent variables, experimental design, and, if applicable, the data collection methods and statistical analysis plan. Thus, a research design is "a framework that has been created to find answers to research questions" (Creswell, 2014).

Following Creswell's definition of research design, the quantitative research approach was selected. An experimental design was selected for the purpose of collecting and analyzing the data. Positivist philosophy was found to be most consistent with the quantitative method used for this research. Then, the research provides some discussions about the research strategy, research types and time horizons. The variables of the research are presented and defined. Then the data collection sources are classified into secondary and primary. The design of the research instrument is explained carefully showing the number of items. The targeted population, the sample selected and the choice of sampling method are major issues in this chapter, which will also consider the validity and reliability of the research. The questionnaire validity is relatability are also considered by the end of this chapter.

4.1 Research setting

The fourth chapter is the methodology section, and presents readers with a summary of the procedures that have been followed to fulfil the purpose of this research, assessing the relationship between social capital and civic engagement in Bahrain, in the absence and presence of knowledge sharing as a mediating variable. The researcher decided to focus his research on the Kingdom of Bahrain for various reasons. Firstly, he lives in Bahrain which is his home city. This facilitated the research process, as contacting the selected population was straightforward, either directly or through social media. Second, the researcher is well aware of many features of the kingdom's social capital, and also knows of civic engagement activities in Bahrain. Furthermore, of the GCC states, Bahrain is particularly known for the increased usage of the internet and social media among its population. The Bahraini population was 1.7 million in January 2020. Reports in February 2020 indicate that there were then 1.65 million internet users in Bahrain and 1.4 million users of social media, making Bahrain a valid setting for the research. Moreover, the researcher wishes to undertake this particular research so that

its outcomes can benefit the local Bahraini community, especially by improving civic engagement in the context of AI and encouraging its development.

Many critical decisions were made, in order to assess the relationship between the research variables. Firstly, positivist philosophy was selected. This philosophy is consistent with the nature of the numerical results that the researcher aims to find. Positivism is also appropriate for the researcher's aims, since it ensures that knowledge is actually derived from experience (Cohen & Maldonado, 2007). Another decision was the selection of the quantitative method. Though the qualitative method would also have been suitable, the researcher considered that the quantitative method was most appropriate for the requirement to generate numerical data, while also assessing the relationship between the research variables. In addition, the experimental design was selected as it enabled the relationship between the variables to be tested. The selection of the experimental research design fitted not only the philosophy of positivism but also the quantitative method. The most important decision taken by the researcher, as this chapter explains, was to use a questionnaire. A questionnaire is the most effective method of collecting quantifiable data, consistent with the positivist philosophy and the quantitative-experimental strategy, while also allowing the researcher to produce specific outcomes that can be generalized.

The implementation of the questionnaire was an important issue for the researcher, particularly as he had also decided to conduct an experiment using ChatBot. The questionnaire took place in two stages: once before the experiment and then again afterwards. The aim of this was to collect data about the relationship between social capital and civic engagement, both before and after sharing knowledge about social capital through ChatBot. The ChatBot was applied via Facebook. For this purpose, 100 university students from an overall sample of 385 were asked to fill in the questionnaire via the ChatBot on 25 March 2020 and then to participate

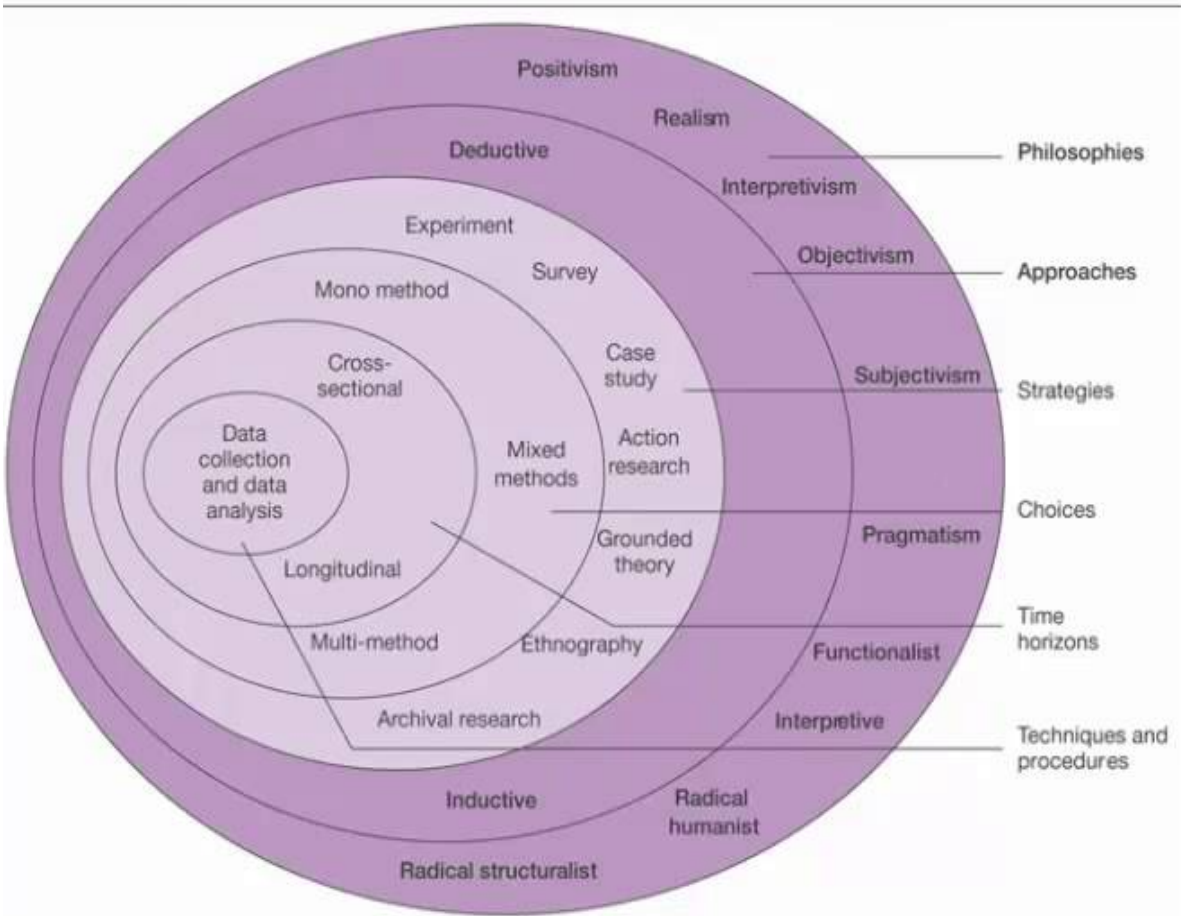
in the experiment on 12 May 2020. Finally, the entire sample of 385 university students were asked to fill in the questionnaire on 25 May 2020, after the ChatBot experiment had taken place.

The collected data was analyzed in order to examine the relationship between social capital and civic engagement, in the absence and presence of knowledge sharing as a mediating variable.

There are many examples of research which apply the same research method, combining quantitative and experimental design (pre-test and post-test) on an experimental group (Posavac & Carey, 1997; Nielsen, 2011; Nurbianta, 2018). The researcher based his approach on these examples.

4.2 Research design

Based on Saunders et al. (2019), the procedures conducted in the research can be presented using the image of an onion (Figure 4.1). The main idea behind this image is to show all the processes of the research as layers. These layers show the order of the procedures. Researchers are allowed to frame this onion according to their aims (Brinkmann & Kvale, 2015). The following sub-sections will provide further details about the selected philosophy, approach, strategy, time horizons, procedures and techniques of the research.



Source: Saunders et al.2019

4.2.1 Research philosophy

There was much discussion about whether positivist or interpretivist philosophy would be more appropriate for this research (Saunders et al., 2019). There are three main types of research philosophy: ontology, epistemology and axiology. The research philosophy differs according to the researcher's view of reality (ontology); views of the nature of knowledge (epistemology); and research values (axiology) (Tracy, 2013).

According to Posavac and Carey (1997), positivism is the most appropriate philosophy for experimental research, which is why the researcher chose to use it. This decision was informed by the nature and purpose of the present research. Also underlying this decision was that some of the prior research followed in this study also uses positivism. This includes the work of Ahmad and Widén (2018); Aslam et al. (2014), and Asdourian and Zimmerli (2018).

This philosophy is appropriate because the researcher aims to achieve quantifiable results. This philosophy also allows for the smallest possible intervention by the researcher, and thus creates a high level of objectivity. Positivism was also selected because "[i]t has an atomistic, ontological view of the world as comprising discrete, observable elements and events that interact in an observable, determined and regular manner" (Collins, 2010), while methodologists also indicate that positivism gives a high level of data verification, because it uses sense data. The collected data is thus based on empirical evidence, so positivism is based on empiricism (Cohen & Maldonado, 2007).

The researcher assumes that the positivist philosophy supports his attempts to understand the relationship between the two variables, as this paradigm was established in accordance with the assumption that a single tangible reality exists. As a result, this reality is easily understood, and can easily be measured and identified. This provides the researcher with more opportunities to predict and explain the interaction of the variables through a causal framework which operates naturally (Park, et al., 2020).

4.2.2 Research approach

Although the qualitative and quantitative approaches to research are the best-known ones that are applicable to social research, researchers sometimes triangulate the two approaches together, in the quantitative-qualitative approach (Saunders et al., 2019). Researchers agree that in the qualitative approach, outcomes tend to include themes, concepts, typologies and categories which are inductively reached from the data (Cohen, 1988). Nevertheless, the deductive quantitative approach has been employed to test the hypotheses that have been formed following the literature review (Acaps, 2012).

Wallace et al. (2010) indicate that using the quantitative approach enables researchers to quantify the behaviors, opinions and attitudes of a sample of individuals concerning the constructs that are being investigated, either individually or in relation to each other. The

quantitative method enables researchers to generate assumptions and then generalize from a small population to a larger one (Trochim, 2002). This research method derives its results using statistical and mathematical tools (Abraham & MacDonald, 2011). Many factors underlie the researcher's decision to use the quantitative method rather than the qualitative.

Firstly, the quantitative method enables the researcher to assess the existing theoretical relationships between the research variables: in this case, social capital (as independent variable); civic engagement (as dependent variable); and knowledge sharing (as mediating variable) (Allen, 2017). Secondly, the researcher can assess the reliability and validity of the instrument using the quantitative method (Creswell, 2002). Thirdly, the quantitative method enables the researcher to reduce the complexity of the research variables, while also testing the hypotheses, and reaching clear and precise outcomes concerning the value, direction and strength of the relationship in the presence and absence of the moderator (Chahal, 2009).

4.2.3 Research strategy, research types and time horizons

Many outstanding researchers have conducted similar studies to the present one, including Posavac and Carey (1997), Nielsen (2011) and Nurbianta (2018). These works, as well as those of famous methodologists, such as Creswell (2014) and Acaps (2012), have contributed specific improvements to the knowledge domain of methodology. Their contributions have focused the attention of researchers on the value of quantitative research. Using the deductive quantitative approach, they have become more able to explain causal relationships between concepts and variables; measure concepts quantitatively; and generalize their findings (Gulati, 2009).

Creswell (2014) asserts that there are four key quantitative research types. These are: the correlational; the descriptive; the experimental; and the quasi-experimental. Following the work of Posavac & Carey (1997), the researcher intends to use the experimental research choice. This is described by Nielsen (2011) as "the research type that is regularly applied in

social and scientific research in which researchers are keen on recognizing the cause and effect relationship between the research variables". It enables hypotheses to be effectively tested and is consistent with the deductive research method. It has been applied in order to test hypotheses formed by the researcher to answer particular research questions (McCombes, 2020) This research applies the pre-test, post-test design in which there is one group of participants. The researcher first applied the pre-test on 100 university students out of a total sample of 385; the experiment was then applied to the same 100 students. All 385 of the selected respondents were given the post-test after the experiment (Ross & Morrison, 2003).

The researcher decided that the data for this research would be collected from university students in the Kingdom of Bahrain between March and June 2020, as using a clearly defined period for data collection is important (Bryman et al., 2019). The impact of social capital on civic engagement in the presence and absence of knowledge sharing in the context of AI was investigated in three phases during this period. The first was the survey (pre-test) implementation. In this phase, the researcher gave the 37-item questionnaire online to a segment of 100 members of the overall sample of 385 students. The main purpose of this pre-test survey was identifying validity (Babbie, 2010). The researcher was also keen to collect data about the two variables from the population before they took part in the experiment that informed the population about civic engagement through social media in the Kingdom of Bahrain. This phase was applied on 25 March 2020. The second phase was the treatment phase, in which the same 100 students took part in the experiment that was expected to affect their behavior (Posavac & Carey, 1997). In the present research, the experiment was carried out through ChatBot, in order to represent the context of AI. This experience was planned via ChatBot. Using ChatBot, the participants were invited to submit their personal data including name, CPR number and nationality. The ChatBot guided the participant to select an event to take part in and a particular timing for it. The participants received an email message with a

confirmation code enabling them to attend the event. The 100 students who had participated in the pre-test phase were invited in this phase to participate in the AI experience planned by the researcher, in order to investigate the impact of knowledge sharing on social media about social capital characterized by AI on civic engagement. This phase was conducted on 12 May 2020. The last phase was the implementation of the survey in the post-test phase. In this phase, all 385 university students in the full research sample were targeted. The survey was circulated to the entire research sample through Google Forms (Google Forms, 2020). The key objective of this phase was to collect data about the independent, dependent and mediating variables, as well as testing the three main hypotheses and sub-hypotheses. This phase took place on 25 May 2020.

4.2.4 Research context

In accordance with the research approach and methodology, the research design is presented in Figure 4.1 below. The outline of the PhD text is as follows:

1. Chapter One contains the introduction in, followed by:
2. The literature review and research gap presented in Chapter Two, leading to:
3. The conceptual framework and development of the hypotheses described in Chapter Three.
4. Chapter Four justifies and presents the research methodology of the study.
5. Chapter Five describes the process and outlines the findings of the data analysis.
6. Chapter Six then contains a discussion of the analysis, in a critical comparison with the literature reviewed in Chapter Two.
7. Chapter Seven concludes this study by summarizing this thesis, highlighting its contributions and limitations, and suggesting opportunities for future research.

The road map describing the empirical research methodology can be found in Figure 4.1 below.

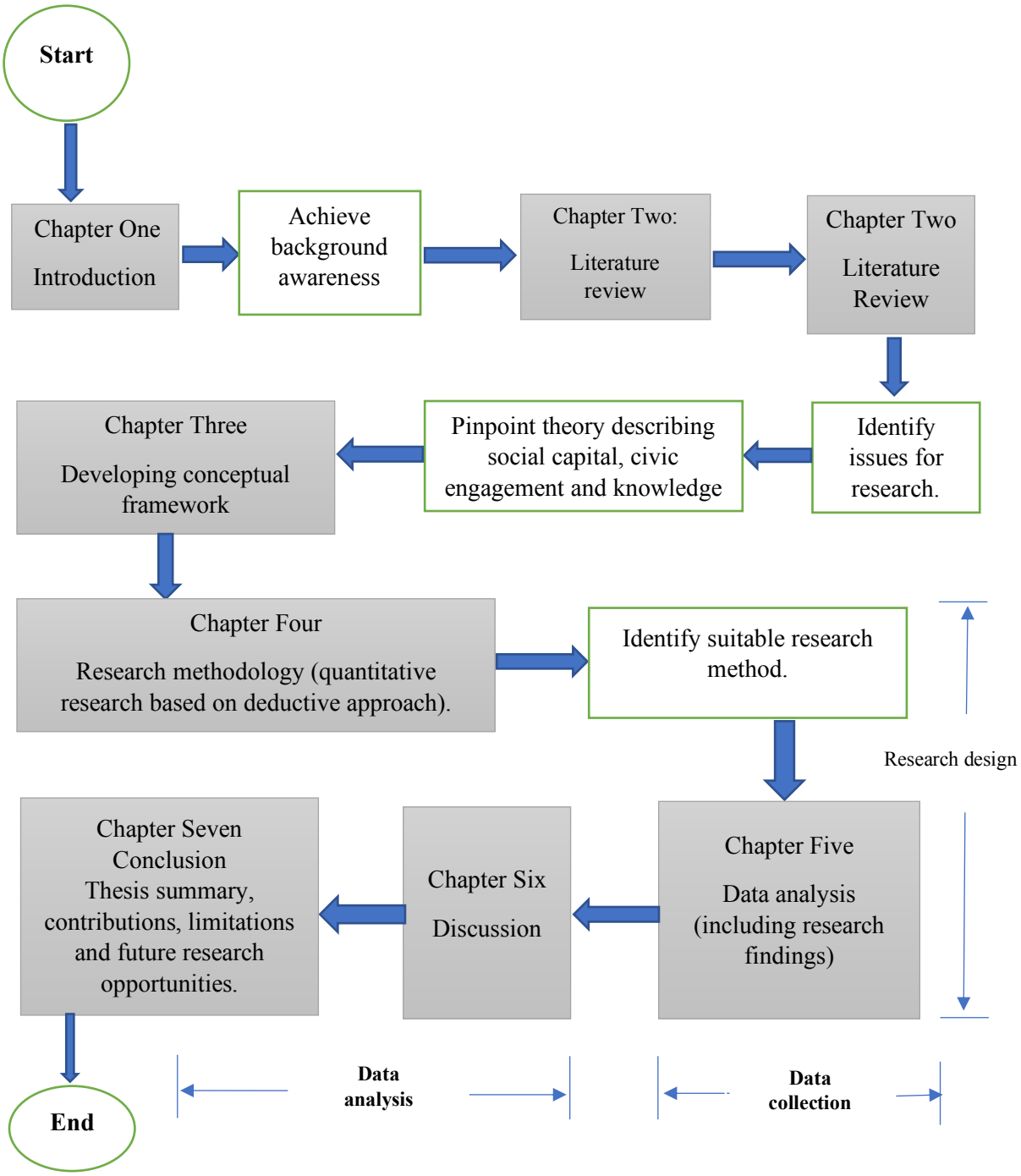


Figure 4.1 Empirical research road map of the PhD

In Figure 4.1, the grey boxes contain the research chapter numbers and titles of the chapters. The white boxes show the outcomes of Chapters One, Two, Three and Four. Chapters One, Two, Three and Four comprise the research design of this thesis. Chapter Five includes the data analysis, while Chapters Six and Seven discuss the data analysis and conclude the study.

4.3 Research variables

Lee, et al. (2002) define a research variable as "anything that has a quantity or quality that varies", Variables are often combined to produce the theoretical framework of research. These variables were chosen in accordance with the literature review for this research topic. A conceptual framework is composed of key variables, factors or constructs (Jabareen, 2009).

The conceptual framework of this work was composed in accordance with this definition, as shown in Chapter Three. The theoretical framework was made up of three variables: social capital, knowledge sharing and civic engagement. Social capital was the independent variable, civic engagement was the dependent variable, and knowledge sharing was the mediating variable. The independent variable played the role of the cause, while the dependent variable played the role of the outcome (Regoniel, 2012), and the mediating variable acted as the control variable. Table 4.1 below defines the research variables and the components which make up these variables.

Table 4.1 Definitions of constructs and items measured

Variable	Definition relevant to this study	Variable measurement	Resources
Social capital (Independent variable)	Networks with shared norms, values, and understanding that facilitate co-operation within or among groups.	Mean score for effectiveness of social capital, out of five.	OECD, 2001
Bonding social capital	Bringing individuals together with others like them (Abbott & Reilly, 2019).	Mean score for effectiveness of bonding social capital, out of five.	Abbott&Reilly, 2019
Bridging social capital	Bringing together individuals with those who are different from them in terms of race, social class, education, age, religion, gender or ethnicity (Abbott & Reilly, 2019).	Mean score for effectiveness of bridging social capital, out of five.	Abbott&Reilly, 2019
Social media	Online architecture for producing content, annotating content produced by others, joining networks to share or view content (e.g., Facebook, Twitter, Instagram) (Jiang & Kontauts, 2019)	Mean score for the status of social media use, out of five.	Jiang and Kontauts, 2019
Knowledge sharing (mediating variable)	Sharing of knowledge on social media (social capital); a concept in which knowledge sharing, knowledge transfer and knowledge creation occurs (Ahmad & Widén, 2018)	Mean score for effectiveness of knowledge sharing, out of five.	Ahmed & Widen, 2018
Civic engagement (dependent variable)	Represented by civic action –the intention to become involved in the future in a community	Mean score for effectiveness of	

	service or action (Wen & Wei, 2018)	civic engagement out of five.	Wen & Wei, 2018
Trust	Citizens' generalized trust and reciprocity, associated with social capital (social media); expressed in terms of the level of agreement to statements given by the participants in civic activities using social media characterized by AI (Wen & Wei, 2018)	Mean score for the status of trust as a component of civic engagement, out of five.	Wen & Wei, 2018
Values	Values of sharing and giving when citizens offer information from their perceptions and improvement proposals with regard to civic issues (Wen & Wei, 2018)	Mean score for the status of value as a component of civic engagement, out of five.	Wen & Wei, 2018

4.4 Data collection

Consistent with the quantitative research method, two data collection sources were used. They are referred to as the primary and secondary data sources.

4.4.1 Primary data sources

Primary data is defined as data obtained directly through a specific new source, without any dependence on existing sources. In most cases, this type of data is collected for research projects which are likely to be shared publicly and then used by other researchers. Some factors motivate researchers to use primary data rather than secondary data. Firstly, it is particularly reliable and authentic, as researchers make minimal interventions in the results, so that there is a high level of objectivity. Secondly, it is collected in order to address a specific research problem. Thirdly, primary data is often up to date, as it is gathered in real time, rather than from existing sources. Finally, the researcher has full control over the collection of primary data (Cohen & Maldonado, 2007).

In the present research, the primary data was collected using the questionnaire, as the most suitable instrument for quantitative research.

4.4.2 Research instrument (questionnaire design)

Saunders, Lewis and Thornhill (2009) state that the quality of the questionnaire used to collected primary data is a significant issue. In this experimental research, the major function of the questionnaire is to create greater understanding of the phenomenon being studied. The current research instrument was designed using Likert-scale close-ended items providing five responses, as described by Wang and Wei (2011). Following the conceptual framework presented in Chapter Three, the focus was civic engagement affected by the mediating role of knowledge sharing which is determined by the points of view of the participants from the Bahraini community. To investigate this framework empirically, aspects of relevant previous research have been adopted in the design and development of the questionnaire (Razzaque,

2012) (see Appendix 1). Following Wen and Wei (2018), the questionnaire was attached to a cover letter which gave the title and purpose of the research (see Appendix 1) and thanked the participants in advance for their anticipated contribution and for the use of their time to complete the questionnaire.

This research adopted aspects of previous studies in the design of its questionnaire (as shown in Table 4.1). These studies include Wen and Wei (2018), Abbott and Reilly (2019), and Ahmad and Widén (2018). The researcher decided to use a five-point Likert scale, which was also used by some of these researchers the researcher argues that the five-point Likert scale is beneficial and creates more balance in the responses than three-point and seven-point scales (Lee, Jones, Mineyama, & Zang, 2002).

As shown in Table 4.1, the independent variable is social capital. A number of items were included in the questionnaire specifically to assess this variable. The value of Cronbach's alpha for the items was 0.842, showing that they were statistically highly reliable (Abbott & Reilly, 2019).

Knowledge sharing is considered to be the mediating variable between social capital and civic engagement, and at the same time is considered to be an independent variable with civic engagement. The items used to assess knowledge sharing were adopted from Ahmad and Widén (2018). The level reliability of the adopted items was 0.783, showing that they were statistically highly reliable. Civic engagement was the dependent variable. The items used to assess it were adopted from Wen and Wei (2018), with a Cronbach's alpha value of 0.810, showing that they were also statistically highly reliable.

Table 4.1 defines these variables as constructs, and gives their item numbers and sources for the data from which the constructs and items were adapted. The current research follows almost the same format as Wen and Wei (2018). It also shows the items which were adapted from their original sources in order to comply with the context of the current research.

This is because the studies from which these research items were adopted refer to quite different contexts from that of the present research.

Items of bonding social capital (5 items)

1	Using social media to connect people engaged in civic activities who can give advice.
2	Requesting advice from close people who are connected through social media and engaged in civic activities.
3	Considering as a reference group close people who are connected through social media and engaged in civic activities.
4	Sharing and discussing knowledge with close people who are connected through social media and engaged in civic activities.
5	Feeling a sense of importance among close people who are connected through social media and engagement in civic activities.

Items of bridging social capital (5 items)

1	Believing most people who are engaged in civic activities and connected through social media across society.
2	Helping strangers who are engaged in civic activities through social media.
3	Engagement in civic activities which will give benefits in the long term.
4	Inclination to connect to civic groups, such as societies, through social media.
5	Engagement of civic groups or societies with government concerning civic matters, using social media.

Items of social media (4 items)

1	Discussions about civic issues between online social groups using artificial intelligence.
2	Online engagement of people enabling participation in civic activities using artificial intelligence.
3	Sharing knowledge about events using artificial intelligence.
4	Scheduling events using artificial intelligence.

Items of knowledge sharing (6 items)

1	Relevant to the topics.
2	Easy to understand.
3	Accurate.
4	Complete.
5	Reliable.
6	Timely.

Items of civic engagement (7 items)

1	I plan to do some volunteer work using AI-based social media.
2	I plan to become involved in my community using AI-based social media.
3	I plan to participate in a community action programs using AI-based social media.
4	I plan to become an active member of my community using AI-based social media.
5	In the future, I plan to participate in a community service organization using AI-based social media.
6	I plan to help others who are in difficulty using AI-based social media.
7	I am committed to making a positive difference using AI-based social media.

Items of trust (6 items)

1	Most people can be trusted.
2	You can't be too careful.
3	People try to be fair.
4	People try to take advantage of you.
5	People try to be helpful.
6	People just look out for themselves.

Items of values (4 items)

1	Willingness to share improved civic engagement practices using AI-based social media.
2	Individual distribution of local data, advice and ideas for improvement in real time of civic issues using AI-based social media.
3	Retrieving information generated by citizens about civic issues using AI-based social media.
4	Information sharing by organizations related to civic issues using AI-based social media.

4.4.3 Target population size

Before the sample determination phase, the researcher had to decide and define the research population. Arikunto (2006) states that "a population is formulated as the whole groups of people who are related to the purpose of the research". Similarly, Creswell (2008) defines the research population as "a group of individuals who have the same characteristics". This indicates that the individuals in the population must have at least one feature in common that differentiates them from those in other groups.

The population of the research includes all university students of the Kingdom of Bahrain. This total number of this population was not known by the researcher.

4.4.4 Sampling strategy

Dimant & Gesche (2020) state that the most suitable sampling technique for experimental research is purposive sampling. Purposive sampling can be defined as "judgmental, selective, or subjective sampling. It is a form of non-probability sampling in which researchers rely on their own judgment when choosing members of the population to participate in their study" (Allen, 2017). The core of this technique is to "produce a sample that can be logically assumed to be representative of the population" (Lavrakas, 2008). This sampling technique is achieved through expert knowledge of the population.

4.4.5 Research sample

Arikunto (2006) states that the research sample constitutes part of the overall research population. However, it is also important that the research sample should be as representative as possible of the entire population. This facilitates the generalization of the research outcomes. Creswell (2008) clarifies that a sample is a "subgroup of the targeted population that the researcher plans to study".

The population of the present research was not known to the researcher, so the following formula was applied to determine the most appropriate number of random respondents.

$SS = (Z\text{-score})^2 * p*(1-p) / (\text{margin of error})^2$

$SS = (1.96)^2 * 0.5*(1-0.5) / (0.05)^2$

$SS = 3.8416 * 0,25 / 0.0025$

$SS = 384.16$

(Z-score is 1.96 for a 95% confidence level.)

Adjusted to the specific population:

$SS\ adjusted = (SS) / 1 + [(SS - 1) / population]$

385 individuals can therefore be targeted as the research population.

In Figure 4.1 above, the grey boxes show the numbers and titles of the research chapters. The white boxes refer to the outcomes of Chapter One, Two, Three and Four, which describe the research design of this thesis. The data collection and data analysis are presented in Chapter Five, while Chapters Six and Seven discuss the analysis of the collected data and provide a conclusion.

4.4.6 Data analysis

To analyze the collected data, the research has made use of the SPSS 22.0 statistical program. The abbreviation SPSS stands for Statistical Package for the Social Sciences. The major reason for using this program is to reach reliable results in the shortest time (Gunarto, 2019). It applies various tests, including descriptive statistics, the Pearson correlation test, and simple and multiple regression. In addition, LISREL 8.80 was also used to assess the relationships between the multiple research variables.

4.5 Data assessment

Following the work of Merriam and Tisdell (2015), it is assumed that researchers who undertake quantitative research are interested in obtaining reliable outcomes from accumulated knowledge about the domain being investigated. This is because they make use of trustworthy investigations based on particular ethical considerations. This research is founded on a high level of reliability and validity. Reliability is the procedure through which researchers find out whether the applied data technique gives accurate findings. Validity enables researchers to know whether their findings are relevant (Saunders et al, 2019).

Wallace, et al (2010) states that using questionnaires for social science research grants a higher level of reliability and validity than any other instrument. This is because they allow different ways of ensuring (Taherdoost, 2016).

4.5.1 Research validity

Boudreau and Gefen (2001) define research validity as "[t]he extent to which the researcher manages to collect data that really covers the actual area of investigation". This means that validity is also "[t]he researcher's success to create questionnaire items that measure what they are planned to be measured". One of the most important types of validity is content validity. The researcher decided to apply this type of validity to the questionnaire used in this thesis. Content validity is dedicated to determining how far the items in the scale can measure the data being evaluated.

Content validity for this research was obtained by presenting the questionnaire to five lecturers from Ahlia University, Bahrain. The lecturers read all 37 items of the questionnaire, as advised by Kim, Kang and Kim (2011). This ensured that the questionnaire was comprehensive and an appropriate instrument for the population being targeted (Gupta & Kim, 2007). The research advisor also reviewed the content of the questionnaire items and confirmed that these items could measure what they were intended to. Some comments and amendments were considered by the researcher.

On 25 March 2020, the researcher pre-tested the questionnaire on 100 students from Ahlia University. This was to assure the academic effectiveness of the questionnaire and to assess other issues, including clarity.

In addition, some post-doctoral faculty members of the university were emailed the questionnaire, and asked to review it for clarity and validity. Some of the 100 participants indicated that they found some items ambiguous and in need of greater clarity, in accordance with Table 4.2. The questionnaire was then amended in response to the most relevant and frequent feedback.

Table 4.2 Feedback on survey clarity and quality from five post-doctoral reviewers

	Participants				
	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
Common Concerns	▪ Grammar needs editing. ▪ All items need to be non-mandatory. ▪ New terms need to be defined (bonding social capital, bridging social capital). ▪ Q.2 about bonding capital needs clarification.	▪ Grammar needs editing. ▪ All items need to be non-mandatory. ▪ New terms need to be defined (AI, civic engagement). ▪ Q.4 about trust needs clarification.	▪ Grammar needs editing. ▪ All items need to be non-mandatory. ▪ New terms need to be defined (social capita, civic engagement). ▪ Q.4 about knowledge sharing needs clarification.	▪ Grammar needs editing ▪ All items need to be non-mandatory. ▪ New terms need to be defined (AI, civic engagement). ▪ Q.2 about bonding capital needs clarification.	▪ Grammar needs editing. ▪ All items need to be non-mandatory. ▪ New terms need to be defined (AI, civic engagement). ▪ Q.3 about social media needs clarification.
Unique Concerns	What is meant by Q.3 about social media?		What is meant by Q.2 about knowledge sharing?	What is meant by Q.1 about bonding capital?	

4.5.2 Research Reliability

Trochim (2002) defines instrumental reliability as "the extent to which an instrument would give the same results if the measurement were to be taken again under the same conditions". One of the most important statistical tests that are used to measure reliability is Cronbach's alpha, which indicates the percentage of internal consistency between the research items and parts. The accepted value is usually 0.7 (70%).

The results of the pilot test data analysis show that, according to Cronbach's alpha, the level of internal consistency for all questionnaire items is 0.896 (89.6%).

Variable		**Number of items**	**Cronbach's alpha**	**Interpretation**
Independent variable (social capital)		10	0.802	Very Good
	Bonding social capital	5	0.761	Good
	Bridging social capital	5	0.823	Very Good
Social media		4	0.815	Very Good
Mediating variable (knowledge sharing)		6	0.825	Very Good
Dependent variable (civic engagement)		7	0.911	Very Good
	Trust	0.819	0.819	Very Good
	Value	0.803	0.803	Very Good
Total questionnaire items		37	0.896	High

4.6. Ethical considerations

The researcher is keen through this research to assure that there her practices adhere to ethicality, to acquire ethical approval the followings was considered and observed from:

- **Confidentiality:** The researcher granted her participants confidentiality of the data they provided. These data are not being allowed to explore by anyone who is not part of the work team.
- **Permission:** all the necessary permissions were taken before circulating and collecting data.
- **Informed consent**: The research entirely reported the participants about the procedures included in the research and they were required to provide their consent to participate.
- **Anonymity:** The researcher assured that all the participants are going to be anonymous throughout the study and even to the researchers themselves to guarantee privacy.

4.6 Research summary

The fourth chapter has discussed the methodological issues related to the present research. Its main objective was to explain the researcher's methodological decisions. The initial justification of the research type (confirmatory and deductive) was followed by the presentation of the chosen research methodology (quantitative). This was followed by a description of the research strategy (experimental online survey). The questionnaire was designed according to the literature available about the research topic. This was succeeded by a presentation of the research design, together with the sources and rationale that underlie it. The phases of the data collection were outlined. The pre-test was described, in which the data was analyzed to assess the validity and reliability of the questionnaire. The researcher also justified the size of the population required for the pre-test and experiment, as well as the sample size of the main data collection.

Chapter Five: Data Analysis

5.1 Introduction

The fifth chapter presents the data analysis process. This is the most important section of the research, as it enables the researcher to answer the research questions and also test the research hypotheses. The data collected from the sample of 263 university students and faculty through the online survey was analyzed using SPSS 22.0.

This chapter describes the procedure of data analysis and reports the empirical findings. The processes and procedures of data analysis required the researcher to test all the main and related sub-hypotheses, assessing the relationship between social capital and civic engagement in the context of AI in the presence of the mediating role of knowledge sharing.

This chapter is structured as follows:

5.2 Demographic data of the respondents This section presents the demographic data of the individuals in the sample, using frequencies and percentages.

5.3 Descriptive statistics for the research variables This section gives the main features of the data collected for each variable, in the light of the mean scores and standard deviations.

5.4 Testing of the hypotheses in this section the hypotheses are tested using the results of the pre-experiment and the post-experiment stages. This helps the researcher to compare the relationship between the two variables in the absence and presence of the mediating variable.

5.5 Comparison between pre-experiment and post-experiment outcomes This section compares the results of the hypothesis tests before and after the ChatBot experiment.

5.2 Demographic data of respondents

Table 5.1 Demographic data of respondents

Measure	Items	Frequency	
		Percentage of responses (n= 263)	Number of responses (n=263)
Gender	Male	32.2%	88
	Female	67.8%	175
Age	18 to 25	44.9%	118
	26 to 35	28.9%	76
	36 to 45	11.8%	31
	46 to 55	11.8%	31
	Older than 55	2.7%	7
Number of years' experience in volunteering	Less than 5	47.5%	125
	5 to 10	1.1%	3
	6 to 15	39.5%	104
	16 to 20	10.6%	28
	More than 20	1.1%	3
Have you used social media for any civic engagement activity?	Yes	85.5%	224
	No	14.5%	39
Applications based on artificial intelligence are currently available, such as applications that can respond to general knowledge questions posed verbally. Have you ever used or come across such applications based on artificial intelligence?	Yes	82.6%	213
	No	17.4%	50
Total		100%	263

Response rate 385 surveys were sent online to students and faculty members of Ahli University who are volunteers in public work and are popular on Facebook. These respondents were selected according to their public activity on Facebook. This was also one of the criteria for selection of the individuals in the sample. 263 surveys were received, of 385 that were originally circulated. This response rate for the research instrument was therefore 68.3%.

Table 5.1 above shows the respondents' gender as follows: 67.8% were female and 32.2% male. The proportions of different age groups were: 44.9% aged 18 to 25; 28.9% aged 26 to 35; 11.8% aged 36 to 45; and also 11.8% aged 46 to 55; finally, 2.7% were over 55.

47.5% had less than 5 years' experience in volunteering; 1.1% had 5-10 years; 39.5% had 6-15 years; 10.6% had 16-20 years; and a further 1.1% had more than 20 years' experience. Concerning social media, 85.5% said that they used it with only 14.5% claiming not to. 82.6% used currently available AI-based applications, but 17.4% did not.

5.3 Descriptive statistics for the research variables

This section presents the descriptive statistics for the data, which summaries the main features of the collected data. The mean score and standard deviations are used in this section.

The mean scores are the most important values derived from the descriptive statistics. The mean score value indicates whether an item is acceptable. The standard on which the researcher depends to interpret these main scores is used in the context of Likert five-score item questionnaires. Based on Table 5.2, the mean scores can be interpreted to determine the minimum and maximum lengths of the five-point Likert scale. The range is calculated by the sum $5 - 1 = 4$, and then dividing the result by five, as it is the greatest value of the scale ($4 \div 5 = 0.80$). Afterwards, number one, the lowest value in the scale, is added to identify the maximum of this cell. The length of the cells is determined below:

Table 5.2 Interpretation of mean scores

Mean range	Interpretation
1.00 - 1.79	Strongly disagree / very ineffective
1.80 - 2.59	Disagree / ineffective
2.60 - 3.39	Neutral / moderately effective
3.40 - 4.19	Agree / effective
4.20 - 5.00	Strongly agree / very effective

The following tables show the mean scores and standard deviations for each construct of the research: social capital (bonding and bridging capital); knowledge sharing; and civic engagement (trust and value).

5.3.1 Descriptive statistics for bonding capital

Table 5.3 Descriptive statistics for bonding capital

Abbr.	Item	N	Min	Max	Mean	STD
BOND 1	Having people who are connected through social media engaged in civic activities who can give advice.	263	1	5	3.29	1.156
BOND 2	Requesting advice from close people who are connected through social media and engaged in civic activities.	263	1	5	3.40	1.149
BOND 3	Considering close people who are connected through social media engaged in civic activities as a reference group.	263	1	5	3.32	1.162
BOND 4	Sharing and discussing with close people who are connected through social media and engaged in civic activities.	263	1	5	3.37	1.197
BOND 5	Feeling a sense of importance among close people who are connected through social media and engagement in civic activities.	263	1	5	3.32	1.138
	Valid N (listwise)	263	1	5	3.34	1.1604

It is evident from Table 5.3 that the respondents perceive the existence of bonding social capital to be moderately effective, as the average mean score for all the items in this section is 3.34.

This mean score falls between 2.60 and 3.39, which is the range showing a moderate effect. This means that social media plays a moderately effective role in bringing individuals together with others like them (Stout et al. 2012). The item with the highest mean score (3.40) was the second, showing that the respondents agree with the concept of ‘Requesting advice from close people who are connected through social media and engaged in civic activities.

The item with the lowest mean score (3.29) was the first, showing that the respondents were neutral towards the concept of 'Having people who are connected through social media engaged in civic activities who can give advice."

5.3.2 Descriptive statistics for bridging capital

Table 5.4 Descriptive statistics for bridging capital

Abbr.	Item	N	Mini	Maxi	Mean	STD
BRD 1	Believing that most people engaged in civic activity are connected through social media in our society.	263	1	5	3.48	1.084
BRD 2	Helping strangers engaged in civic activities through social media.	263	1	5	3.45	1.126
BRD 3	Engagement in civic activities with long-term benefits.	263	1	5	3.49	1.091
BRD 4	Inclination to connect to civic groups such as societies through social media.	263	1	5	3.49	1.135
BRD 5	Engagement of civic groups or societies with government in civic matters using social media.	263	1	5	3.48	1.122
	Valid N (listwise)	263	1	5	3.47	1.160

Table 5.4, the average mean score is 3.47 showing that bridging social capital is effective in the Bahraini community. This average falls in the range from 3.4 to 4.19, which indicates effectiveness. This shows that social media is effective in its role of bringing together individuals with those who are different from them in terms of race, social class, education, age, religion, gender or ethnicity (Stout et al., 2012). The item with the highest mean score (3.49) was the third, showing that the respondents agreed with the concept of 'Engagement in civic activities with long-term benefits. The item with the lowest mean score (3.45) was the

second. The respondents agreed with the concept of 'Helping strangers engaged in civic activities through social media'.

5.3.3 Descriptive statistics for social capital

Table 5.5 Descriptive statistics for social capital

Abbreviation	Item	N	Mini	Maxi	Mean	STD
SM 1	Discussions on various civic issues between online social groups using artificial intelligence.	263	1	5	3.48	1.139
SM 2	Online participation in civic activities using artificial intelligence.	263	1	5	3.56	1.170
SM 3	Sharing knowledge about events using artificial intelligence.	263	1	5	3.46	1.168
SM 4	Scheduling events using artificial intelligence.	263	1	5	3.47	1.210
	Valid N (listwise)	263	1	5	3.49	1.170

Table 5.5 shows that the respondents perceived that social capital is effective in the Bahraini community, as the average mean score is 3.49. This average mean score falls between 3.40 and 4.19, the range showing effectiveness. This indicates that social capital involving social media is effective. This section shows that AI-based social media represents the status of social capital in Bahraini society effectively. The item with the highest mean score (3.56) is the second. The respondents agree with the concept of 'Online participation in civic activities using artificial intelligence". The item with the lowest mean score (3.46) was the third, although the respondents agree on its content.

5.3.4 Descriptive statistics for knowledge sharing

Table 5.6 Descriptive statistics for knowledge sharing

Abbr.	Item	N	Mini	Maxi	Mean	STD
KSH 1	Relevant to the topics.	263	1	5	3.54	1.101
KSH 2	Easy to understand.	263	1	5	3.64	1.050
KSH 3	Accurate.	263	1	5	3.52	1.181
KSH 4	Complete.	263	1	5	3.54	1.128
KSH 5	Reliable.	263	1	5	3.53	1.090
KSH 6	Timely.	263	1	5	3.48	1.125
	Valid N (listwise)	263	1	5	3.54	1.110

Table 5.6 shows that the respondents perceive that knowledge sharing on social media in the Bahraini community is effective, as the average mean score is 3.54, which falls between 3.39 and 4.19. This means that sharing of knowledge on social media (social capital) is effective, and therefore that knowledge sharing, knowledge transfer and knowledge creation are all effective. The item with the highest mean score (3.64) was the second, 'Easy to understand'. The item with the lowest mean score (3.52) was the third, 'Accurate'.

5.3.5 Descriptive statistics for civic engagement

Table 5.7 Descriptive statistics for civic engagement

Abbr.	Item	N	Mini	Maxi	Mean	STD
CE 1	I plan to do some volunteer work using AI-based social media.	263	1	5	3.62	1.086
CE 2	I plan to become involved in my community using AI-based social media.	263	1	5	3.49	1.130
CE 3	I plan to participate in a community action program using AI-based social media.	263	1	5	3.54	1.128
CE 4	I plan to become an active member of my community using AI-based social media.	263	1	5	3.53	1.108
CE 5	In the future, I plan to participate in a community service organization using AI-based social media.	263	1	5	3.61	1.178
CE6	I plan to help others who are in difficulty using AI-based social media.	263	1	5	3.66	1.104
CE7	I am committed to making a positive difference using AI-based social media.	263	1	5	3.62	1.126
	Valid N (listwise)	263	1	5	3.58	1.120

Table 5.7 shows that the respondents perceived that civic engagement represented by civic action in the Bahraini community is effective, as the average mean score is 3.58, which falls between 3.39 and 4.19. This means that there are effective present and future intentions by university students and faculty in Bahrain to undertake community service or action. The item with the highest mean score (3.66) is the sixth. The respondents agree that 'I plan to help others who are in difficulty using AI-based social media'. The item with the lowest mean score (3.49)

was the second. The respondents agreed with the concept that 'I plan to become involved in my community using AI-based social media'.

5.3.6. Descriptive statistics for trust

Table 5.8 Descriptive statistics for trust

Abbr.	Item	N	Mini	Maxi	Mean	STD
TR 1	Most people can be trusted.	263	1	5	3.56	1.075
TR 2	You can't be too careful.	263	1	5	3.70	1.092
TR 3	People try to be fair.	263	1	5	3.53	1.122
TR 4	People try to take advantage of you.	263	1	5	3.59	1.112
TR 5	People try to be helpful.	263	1	5	3.57	1.076
TR 6	People just look out for themselves.	263	1	5	3.63	1.061
	Valid N (listwise)	263	1	5	3.59	1.080

Table 5.8 shows that the respondents perceive the importance of trust as a component of civic engagement represented by civic action in Bahraini society, as the average mean score is 3.59, which falls between 3.40 and 4.19. This means that generalized trust shown by the respondents in civic activities using AI-based social media is important. The item with the highest mean score (3.70) is the second. The respondents agreed that 'You can't be too careful'. The item with the lowest mean score (3.56) was the first. The respondents agreed that 'Most people can be trusted'.

5.3.7 Descriptive statistics for value

Table 5.8 Descriptive statistics for value

Abbr.	Item	N	Mini	Maxi	Mean	STD
VA1	Willingness to share, improved practices (civic engagement) using AI-based social media.	263	1	5	3.52	1.135
VA2	Individual distribution of local data, advice and ideas for improvement in real time of civic issues using AI-based social media.	263	1	5	3.39	1.113
VA3	Retrieving information generated by citizens about civic issues using AI-based social media.	263	1	5	3.48	1.103
VA4	Information sharing by organizations related to civic issues using AI-based social media.	263	1	5	3.48	1.125
	Valid N (listwise)	263	1	5	3.46	1.110

Table 5.8 shows that the respondents perceive the importance of value as a component of civic engagement represented by civic action in Bahraini society, as the average mean score is 3.46, which falls between 3.40 and 4.19. This means that the values of sharing and giving, when citizens offer information from their perceptions and betterment proposals with regard to civic issues, were important to the respondents. The item with the highest mean score (3.52) was the first. The respondents agreed with 'Willingness to share, improved practices (civic engagement) using AI-based social media'. The item with the lowest mean score (3.39) was the second. The respondents agreed that 'Individual distribution of local data, advice and ideas for improvement in real time of civic issues using AI-based social media'.

5.4 Testing of hypotheses

In this section, the hypotheses will be tested in the light of the pre-experiment and post-experiment results. The key objective of this section is to provide empirical evidence for the six main hypotheses. These hypothesis-testing procedures aim to indicate the impact of social capital on civic engagement in the presence and absence of knowledge sharing.

The following tables show the significance of the relationships between the research variables as presented in Figure 3.1:

(1) Bonding capital and social capital

(2) Bridging capital and social capital

(3) Social capital and knowledge sharing

(4) Knowledge sharing and civic engagement

(5) Trust and civic engagement

(6) Values and civic engagement

(7) Social capital and civic engagement

All the tables are generated using SPSS 22.0. The t-value indicates a negative significance when its value is < -1.96. However, no significance exists if the t-value is between 1.96 and -1.96, while there is a positive significance if the t-value is > 1.96 (Diamantopoulos & Siguaw, 2000).

5.4.1 Pearson correlation

The Pearson correlation is applied to determine the strengths and direction of the relationships between the tested variables.

Table 5.9 Pearson correlation test applied to research constructs

		Bonding capital	Bridging capital	Social capital	Knowledge sharing	Civic engagement	Trust	Value
Bonding capital	Pearson Correlation	1	.686**	.562**	.514**	.510**	.495**	.426**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
	N	263	263	263	263	263	263	263
Bridging capital	Pearson Correlation	.686**	1	.689**	.657**	.591**	.545**	.509**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	263	263	263	263	263	263	263
Social capital	Pearson Correlation	.562**	.689**	1	.719**	.657**	.519**	.481**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000
	N	263	263	263	263	263	263	263
Knowledge sharing	Pearson Correlation	.514**	.657**	.719**	1	.717**	.523**	.503**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000
	N	263	263	263	263	263	263	263
Civic engagement	Pearson Correlation	.510**	.591**	.657**	.717**	1	.667**	.615**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000
	N	263	263	263	263	263	263	263
Trust	Pearson Correlation	.495**	.545**	.519**	.523**	.667**	1	.696**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000
	N	263	263	263	263	263	263	263
Values	Pearson Correlation	.426**	.509**	.481**	.503**	.615**	.696**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	
	N	263	263	263	263	263	263	263
**Correlation is significant at the 0.01 level (2-tailed).								

Based on the values which emerge from the Pearson regression in Table 5.9, it is evident that there is a positive strong correlation between bonding capital and social capital (0.562**), and between bridging capital and social capital (0.689**). Both bonding and bridging capital have a significant correlation with social capital at 1%, as the sig. value is 0.00, which is below 0.01.

Likewise, bonding capital and bridging capital have a positive significant correlation with knowledge sharing, as the correlation values are 0.514** and 0.657**. Both bonding and bridging capital have a significant correlation with knowledge sharing at 1%, as the sig. value is 0.00, which is below 0.01. Knowledge sharing has a positive significant correlation with civic engagement (0.717**).

Trust and values have positive significant correlations with civic engagement, of 0.667** and 0.615** respectively. Both values and trust have a significant correlation with civic engagement at 1%, as the sig. value is 0.00, which is below 0.01.

5.4.2 Testing hypotheses based on the pre-experiment data

In this section, the researcher tests the seven research hypotheses are tested, using the data collected from the sampled individuals about the research variables, before the implementation of the ChatBot experiment. (See Table 5.10)

Table 5.10 Estimated coefficients based on the pre-experiment data

Hypothesis	**Estimated Coefficient**			**Interpretation**
	t-value	R-squared	Sig.	
H1: There is a significant and positive relationship between bonding capital and social capital.	1.027	0.004	0.305	H1 is rejected. Negative and insignificant relationship
H2: There is a significant and positive relationship between bridging capital and social capital.	3.365	0.382	0.001	H2 is accepted. Positive and significant relationship
H3: There is a significant and positive relationship between social capital and civic engagement.	-1.711	0.151	0.088	H3 is rejected. Negative and insignificant relationship
H4: The impact of social capital on civic engagement is significantly and positively mediated by knowledge sharing.	2.936	0.063	0.201	H4 is rejected. Positive and insignificant relationship
H5: There is a significant and positive relationship between trust and civic engagement.	11.147	0.522	0.009	H5 is accepted. Positive and significant relationship
H6: There is a significant and positive relationship between values and civic engagement.	0.890	0.101	0.374	H6 is rejected. Negative and insignificant relationship.

Based on the estimated coefficients that emerge from the regression analysis of the seven hypotheses in Table 5.10, these hypotheses can be tested to determine which can be accepted and which should be rejected. The most important basis here is the sig. value. If it is below 0.01 or 0.05, the hypothesis is accepted and there will be a significant relationship between the independent and dependent variables. As previously mentioned, the t-value also shows the direction of this relationship. When the t-value is < -1.96, no significance exists. When the t-value is between 1.96 and -1.96, there is negative significance. Positive significance is shown when the t-value is > 1.96 (Diamantopoulos & Siguaw, 2000). The R squared value indicates the amount of variance in the dependent variable when the independent variable increases or moves up.

For the **first** hypothesis, which tests the relationship between bonding capital and social capital, the sig. value is 0.305, which is above 0.01 and 0.05, showing that the relationship is insignificant. The t-value is 1.027, which is between -1.96 and 1.96. This indicates that the relationship is insignificant and negative. The alternative hypothesis is therefore rejected and the null is accepted: it can be concluded that 'There is an insignificant and negative relationship between bonding capital and social capital'.

For the **second** hypothesis, which tests the relationship between bridging capital and social capital, the sig. value is 0.001, which is below 0.01. The t-value is 3.365, which is above 1.96. The R-squared value is 0.382. The R-squared value shows that bridging social capital is responsible for 38.2% of any increase or positive change in social capital. The alternative hypothesis is therefore accepted: it can be concluded that "There is a significant and positive relationship between social capital and knowledge sharing".

For the **third** hypothesis, which addresses the relationship between social capital and civic engagement, the sig. value is 0.088, which is above 0.05, The t-value is -1.711, which is between -1.96 and 1.96. The alternative hypothesis is therefore rejected: it can be concluded

that ‘There is an insignificant and positive relationship between social capital and civic engagement’.

For the **fourth** hypothesis, which explores the relationship between social capital and knowledge sharing, the sig. value is 0.201, which is above 0.05. The t-value is -2.936, which is above 1.96The alternative hypothesis is therefore rejected and the null hypothesis is accepted: it can be concluded that ‘There is an insignificant and positive relationship between social capital and knowledge sharing’. 30.11.20

For the **fifth** hypothesis, which tests the impact of trust on civic engagement, and whether it is significantly and positively mediated by knowledge sharing, the sig. value is 0.009, which is below 0.05. The t-value is 11.147, which is above 1.96. this means that the relationship is positive and insignificant. As a result, the alternative hypothesis is accepted and the alternative hypothesis is accepted: it can be concluded that ‘**There is a significant and positive relationship between trust and civic engagement**.

For the **sixth** hypothesis, which addresses the relationship between values and civic engagement, the sig. value is 0.374, which is above 0.05. The t-value is 0.890, which is between -1.96 and 1.96. The alternative hypothesis is therefore rejected and the null hypothesis is accepted: it can be concluded that ‘There is an insignificant and negative relationship between values of people and civic engagement’.

5.4.3 Hypothesis testing based on the post-experiment data

In this section, the researcher tests the seven research hypotheses, using the data collected from the sample individuals about the research variables after the ChatBot experiment.

Table 5.11 Estimated coefficients based on the post-experiment data

Hypothesis	Estimated Coefficient			Interpretation
	t-value	R-squared	Sig.	
H1: There is a significant and positive relationship between bonding capital and social capital.	10.986	0.316	0.000	H1 is accepted. Positive and significant relationship
H2: There is a significant and positive relationship between bridging capital and social capital.	15.351	0.474	0.000	H2 is accepted. Positive and significant relationship
H3: There is a significant and positive relationship between social capital and civic engagement.	16.692	0.516	0.000	H3 is accepted. Positive and significant relationship
H4:The impact of social capital on civic engagement is significantly and positively mediated by knowledge sharing	16.638	0.515	0.000	H4 is accepted. Positive and significant relationship
H5: There is a significant and positive relationship between trust and civic engagement.	14.451	0.444	0.000	H5 is accepted. Positive and significant relationship
H6: There is a significant and positive relationship between values and civic engagement.	12.607	0.378	0.000	H6 is accepted. Positive and significant relationship.

For the first hypothesis, which explores the relationship between bonding capital and social capital, the sig, value is 0.000, which is below 0.01, indicating that the relationship is significant. The t-value is 10.986, which is above 1.96, indicating a significant and positive relationship. The alternative hypothesis is therefore accepted: it can be concluded that 'There is a significant and positive relationship between bonding capital and social capital'.

For the second hypothesis, which addresses the relationship between bridging capital and social capital, the sig value is 0.000, which is below 0.01. The t-value is 15.351, which is above 1.96. The R-squared value is 0.474. The R-squared value shows that bridging social capital is responsible for 47.4% of any increase or change in social capital. The alternative hypothesis is therefore accepted: it can be concluded that 'There is a significant and positive relationship between social capital and knowledge sharing'.

For the third hypothesis, which examines the relationship between social capital and civic engagement, the sig. value is 0.000, which is below 0.01. The t-value is 14.079, which is above 1.96. The alternative hypothesis is therefore accepted: it can be concluded that 'There is a significant and positive relationship between social capital and civic engagement'.

For the fourth hypothesis, which investigates the impact of social capital on civic engagement, and whether it is significantly and positively mediated by knowledge sharing, the sig. value is 0.000, which is below 0.01. The t-value is 16.638, which is above 1.96. The alternative hypothesis is therefore accepted. The R-squared value is 0.515. The R-square shows that knowledge sharing mediates the relationship by 51.5%, a significant extent. It can be concluded that 'The impact of social capital on civic engagement is significantly and positively mediated by knowledge sharing'.

For the fifth hypothesis, which investigates the relationship between trust and civic engagement, the sig. value is 0.000, which is below 0.01. The t-value is 14.451, showing that the relationship is positive and significant. Trust is responsible for 44.4% of any change in civic

engagement. It can be concluded that ‘There is a significant and positive relationship between trust in between people and civic engagement’.

For the sixth hypothesis, which examines the relationship between values and civic engagement, the sig. value is 0.000, which is below 0.0. The t-value is 12.607, which is above 1.96. The alternative hypothesis is therefore accepted: it can be concluded that ‘There is a significant and positive relationship between values of people and civic engagement’.

All six hypotheses are accepted in the light of the data collected from the 263 individuals in the sample after the ChatBot experiment. The relationships between the research variables have been shown to be positive and significant.

5.5 Comparison between the pre-experiment and post-experiment outcomes

Table 5.12. T-test: Two-sample, assuming equal variances

	Before the experiment	After the experiment
Mean	0.179571	0
Variance	0.022208	0
Observations	7	7
Pooled Variance	0.011104	
Hypothesized Mean Difference	0	
df	12	
t Stat	3.1881	
P(T<=t) one-tail	0.003901	
t Critical one-tail	1.782288	
P(T<=t) two-tail	0.007803	
t Critical two-tail	2.178813	

This section gives the values of the estimated coefficients resulting from the two regression tests (pre-experiment and post-experiment).

The most important of the t-test results is agreed to be the p-value, shown in Table 5.12 above. As a result of setting the alpha value at 0.05, and because the p-value of 0.007 is below 0.05, it can be assumed that there is a statistically significant difference between the estimated coefficients of the pre-experiment and post-experiment results.

Furthermore, when the outcomes of hypothesis testing for the data collected before and after the experiment are compared, using Tables 5.10 and 5.11, it is evident that the respondents' perceptions of the relationship between social capital and knowledge sharing varied. Before the experiment, the respondents perceived the relationship to be negative and insignificant (sig. value = 0.88; t-value = -1.711). However, after the experiment, they perceived it to be positive and significant (sig. value = 0.000; t-value = 16.962). There was also

variation in perceptions of the relationship between knowledge sharing and civic engagement. Before the experiment, the relationship was perceived to be positive and insignificant (sig. value = 0.201; t-value = 2.936). However, after the experiment, the relationship was seen to be positive and significant (sig. value = 0.000; t-value = 16.683).

Similarly, the results for the relationship between social capital and civic engagement showed that before the experiment this was perceived to be a positive and insignificant relationship (sig. value = 0.279; t-value = 1.352). However, it was seen to be positive and significant after the experiment (sig. value = 0.000; t-value = 14.79).

5.6. Structural Equation Model:

The mediating role of knowledge sharing as the mediating variable in this research between the social capital as the independent variable and civic engagement as the dependent variable can also be assessed by the Structural Equation Model (SEM), the researcher makes use of the mediating role testing theory by Baron and Kenny (1986). This research makes use of this model for assessing the mediating role of knowledge sharing because Baron & Kenny (1986) 's mediation process and theory was also employed in many other previous research> these studies include such as (Lin, 2011), and (Avolio, Zhu, Koh, & Bhatia, 2004).

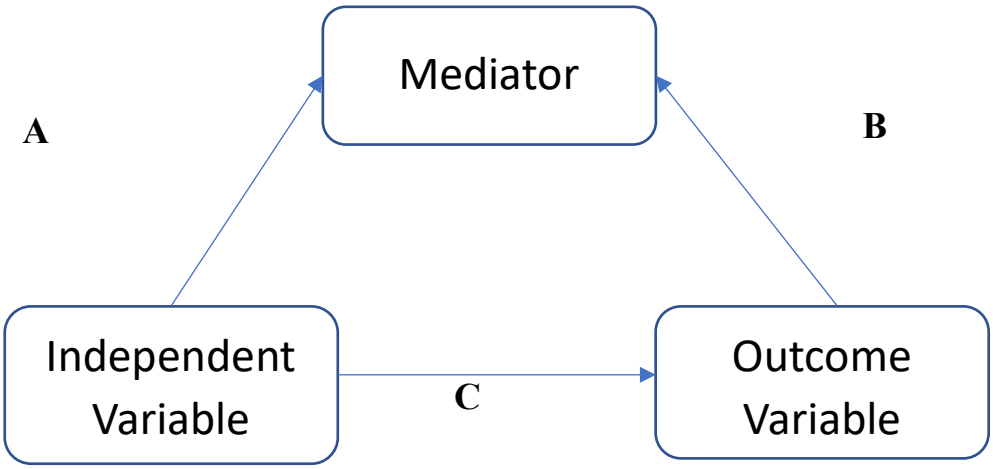


Figure 5.1. Testing hypotheses using a mediating role testing theory based on Baron and Kenny (1986)'s model

In accordance to the model of (Baron and Kenny, 1986):

"The variable plays the role of a mediator once it is able to meet some conditions including:

(1) Identifying some variations related to the degrees of the independent variable that significantly justify the variations in the presumed mediator such as (i.e., Path c).

(2) Variations in the mediator justify variations in the dependent variable in a significant manner such as (i.e., Path b).

(3) Once Paths a and b are under control, any prior significant association amongst the independent and dependent variables do no longer seem to be significant, with the strongest demonstration of mediation occurring when Path c is zero.

Concerning the 3rd and final condition, it is possible that a continuum be envisaged. Once Path c is reduced to zero, there is a fortified evidence for a single, dominant mediator. In case the residual Path c is not zero, this shows the operation of multiple mediating factors".

Table 5.13 Empirical tests of mediator effects with their regression coefficients: mediating effect between SC → KSH → CE

Path A	**Path B**	**Path C (during absence of KSH)**	**Path C (during presence of KSH)**
SC → KSH	KSH→ CE	SC → CE	SC $\xrightarrow{KSH}$ CE
.12***	.42***	.61***	0.48***

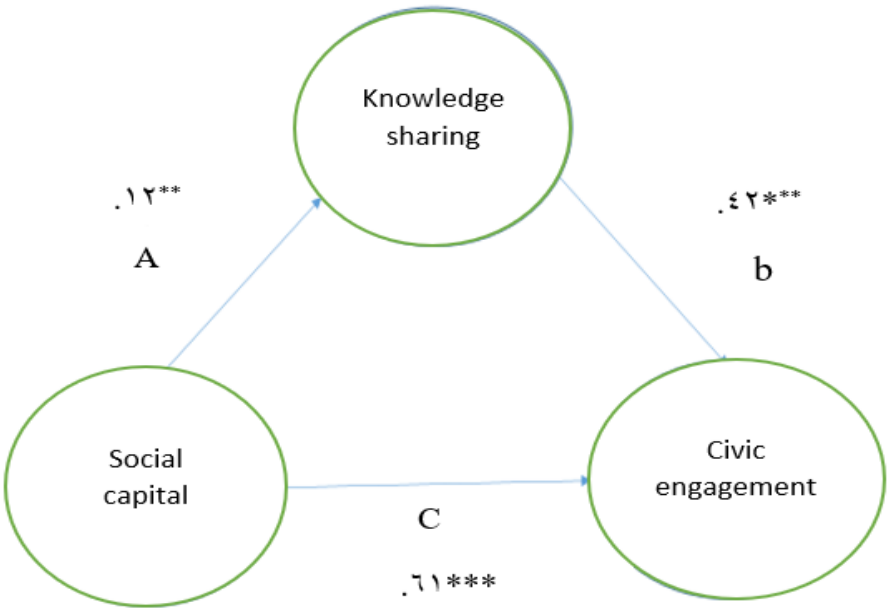


Figure 6.2. Structural Model between Social capital → Knowledge Sharing and→ Civic Engagement

In accordance to the tables 5.13, it is evident that, social capital haves a significant and positive relationship with knowledge sharing. In addition, Social capital have a significant relationship with civic engagement both in the presence and absence of knowledge sharing. Knowledge sharing as a mediator variable has a significant relationship with civic engagement.

5.7. Summary

The major aim of this chapter was to present the processes and procedures of data analysis. Various types of statistics have been comprehensively presented. They have been interpreted and reported using the precedents set by previous researchers in their related research, using similar statistical tests. The statistical outcomes have been compared to the corresponding hypotheses. The empirical evidence has set the stage for this research to fulfil the aim and objectives, to assess the relationship between social capital and civic engagement in the context of AI, and in the absence and presence of knowledge sharing. The empirical findings support

the three hypotheses. This chapter supports Chapter 6, which aims to integrate the empirical evidence with the literature review.

Chapter Six: Discussion

6.1 Introduction

Chapter 5 presented the processes and procedures of data analysis. The data was analyzed using SPSS, with tests including descriptive statistics, Pearson correlation, and simple and multiple regressions. Chapter 6 discusses these empirical findings, and compares them to the literature which was reviewed in Chapters 2 and 3. The discussion is expected to highlight both those theories that support the findings and those which do not. In addition, a further literature review will be undertaken to suggest possible explanations when those theories do not support the findings. Chapter 6 is structured as follows:

6.2 Evaluation of findings.

6.3 Addressing the research problem.

6.4 Critical evaluation of the applied research approach.

6.2 Evaluation of findings

To assess whether the research problem stated earlier has been comprehensively answered, the following causes and consequences had to be investigated.

(1) The direct relationships between the independent variable, social capital (SC), and its components (categories), bonding capital and bridging capital, as represented by H1 and H2.

(2) The direct relationship between the independent variable, social capital, and civic engagement, as represented by H3.

(3) The mediating role played by knowledge sharing between social capital and civic engagement, as represented by H4.

(4) The direct relationship between civic engagement and its components, trust and values, as represented by H5 and H6.

The data analysis undertaken in Chapter 5 suggests that there are actually two categories of empirical findings.

(1) The assessment of some variables (independent and dependent) through controlling other variables during the absence and presence of another variable (mediator). For instance, knowledge sharing was controlled in order to assess the relationship between social capital and civic engagement.

(2) A four-step process proposed by Baron and Kenny (1986), required to assess the relationship of each independent variable with the mediating and dependent variables, while the other independent variables are controlled. For instance, the mediating role of knowledge sharing in the relationship between social capital and civic engagement.

The empirical findings of the present research can be said to add value to the work of Wen and Wei (2018). This relates in particular in the use of regression between the research variables in Chapter 5. In that chapter, a practical assessment was made of those relationships, in the light of the applied model. The next section describes the causes and consequences of these empirical findings, as suggested by the literature reviewed in Chapters 2 and 3.

6.2.1 Empirical findings concerning the social capital → civic engagement relationship

The researcher decided to investigate the relationship between social capital and civic engagement because much previous research has examined this relationship and indicated the need for further research about it (e.g. Abbott & Reilly (2019), and Wen and Wei (2018)). The researcher's decision was confirmed after further study of Wen and Wei (2018), which indicated that the association between social capital and civic engagement is weak. The model developed by the researcher supports this conclusion. The work of Wen and Wei (2018) directly supports the relationship, even though it is weak. However, their conclusion is not

consistent with other research, including that of Theocharis and Lowe (2016) and Dimitrova et al. (2014), who showed a reasonably strong and valid relationship between the two variables.

The disagreement between these conclusions has been a major reason for assessing the relationship between these variables.

There is also a lack of clarity in the literature about the relationship between social capital and civic engagement, which motivated the researcher to investigate the relationship. As a result, an assessment was made of the contribution of social capital to civic engagement through AI-based social media.

AI is an overall context through which the relationship between social capital and civic engagement can be observed.

6.2.1.1 Assessing the relationship between Bonding capital and social capital

Analysis of the collected data reveals that bonding capital as a category of social capital is positively and strongly associated with social capital, based on the value of 0.562** for the Pearson correlation. According to the regression model, the relationship was the same before and after the experiment. This relationship was to shown to be positive and significant in both cases, as the sig. value was 0.00, which is below 0.05 and 0.01. This finding is in line with the conclusions of Sato (2013), which show bonding capital is a major and significant contributor to social capital. This is directly derived from social capital theory.

6.2.1.2 Assessing the relationship between bridging capital and social capital

Analysis of the collected data reveals that bonding capital, as a category of social capital, is positively and strongly associated with social capital. This is based on the value of 0.689** for the Pearson correlation. According to the regression model, the relationship was different before and after the experiment. Before the experiment, the relationship was positive and insignificant. as the sig. value was 0.305. However, afterwards, the relationship was positive and significant, as the sig. value was 0.00, which is below 0.05 and 0.01. This finding is in line

with the conclusion of Sato (2013), that bridging capital is a major and significant contributor to social capital. This is directly derived from social capital theory.

6.2.1.3 Assessing the relationship between social capital and civic engagement

Analysis of the collected data reveals that social capital is significantly and positively linked to civic engagement. This is based on the value of 0.657** for the Pearson correlation.

According to the regression model, the relationship was different before and after the experiment. Before the experiment, the relationship was positive and insignificant, as the sig. value was 0.088. However, afterwards, the relationship was positive and significant, as the sig. value was 0.00, below 0.05 and 0.01. This is in line with some of the existing theory. For example, the interaction and participation (AIP) model does not comply with this finding (Carpentier, 2012). Similarly, the Civic Culture Framework shows contractions between the findings (Dahlgren, 2009).

This is evidence that the direct relationship between social capital and civic engagement exists in the absence of knowledge sharing. In this case the relationship was tested directly. This is consistent with the findings of Sommerfeldt (2012), which showed that the direct relationship with social capital is supported through the platforms of social networks. Such social networks provide opportunities for people to become socially engaged and to contribute positively to their community. Social capital, represented by social platforms such as YouTube, Facebook and Twitter, provides individuals with platforms to volunteer in civic engagement activities and initiatives (Nielson, 2010). The most two popular examples in which social networks were used by individuals to contribute to civic engagement activities are probably the 2011 Occupy movement and the Arab Spring movement in the Middle East. In these examples, social media platforms were used to organize protests and gatherings (Samad , 2020).

6.2.1.4 Assessing the relationship between social capital and knowledge sharing

The present research examines the roles of social capital theory on bonding capital and bridging capital. These are assessed in relation to knowledge sharing, the mediating variable in the research, using the Pearson correlation. Knowledge sharing as a mediator is described in the overall structural model.

The existing literature shows that bonding and bridging social capital are the most significant determinants of social capital (e.g. Wen & Wei, 2018; Myeong & Seo, 2016). Wen and Wei 2018) argue that social capital is mainly determined via bonding or bridging between the actors involved in civic engagement, as does Kapucu (2011) This empirical evidence is combined with the fourth hypothesis in the present research to show that there is a strong and significant correlation between social capital and knowledge sharing (0.719**). Based on the regression, the relationship between social capital and knowledge sharing was positive and insignificant (0.22) before the experiment and positive and significant (0.00) after. This is in line with the conclusions of Michailova and Minbaeva (2012) who showed that 'the bonding between members involved in civic engagement and social media networks is insignificantly and negatively associated with knowledge sharing on social media about social capital characterized by AI in VC in the Kingdom of Bahrain'. Likewise, it is shown that 'the bridging between members involved in civic engagement and social media networks is significantly and positively associated with knowledge sharing about social capital characterized by AI in VC in the Kingdom of Bahrain'.

The significance of the relationship between social capital and knowledge sharing, as shown in the regression test, is further evidence that bonding social capital is one component of social capital. This is despite the rule stating that what applies to the whole may not apply to the parts. This is supported by Fischer (2005), who suggested that 'bridging' and 'bonding' are used as conjectures linked to social capital (Wen & Wei, 2018; Myeong & Seo, 2016).

Bridging social capital is the other component of social capital examined in the present research. There is no clear evidence in the literature for the relationship between bridging capital and knowledge sharing suggested by Brenne (2016) who recommended the usefulness of assessing such a relationship. This is because social media representing social capital is a concept in which knowledge sharing, knowledge transfer and knowledge creation can all be perceived (Qi & Leung, 2015; Zaffar & Ghazawneh, 2012). This means that it is essential to assess the integration of the concepts of social media as a representation of social capital and knowledge sharing as a single thesis. This requires comprehensive recognition in the literature, particularly in an era when social media is moving towards the introduction of AI.

6.2.1.5 Assessing the relationship between knowledge sharing and civic engagement

There is evidence in the existing literature that civic engagement is likely to be supported by knowledge sharing. Data analysis for the relationship with knowledge sharing in the present research was carried out using a regression test that reflects the outcomes of the regression between knowledge sharing and civic engagement. The value of 0.717** for the Pearson correlation shows that there is a strong and positive relationship between knowledge sharing and civic engagement. The regression test showed that the relationship was the same before and after the experiment, with values of 0.009 and 0.00. These outcomes demonstrate that the relationship between knowledge sharing and civic engagement is significant and positive.

This seems to be empirically supported by the outcomes reached by Asdourian and Zimmerli 2018; Wen and Wei 2018; and Nascimento et al. 2016. It also complies with the conclusions reached by Asdourian and Zimmerli (2018), who asserted that “knowledge drives civic engagement”. These results are similar to those in the work of Rastegar and Hady (2017). Knowledge is perfectly shared between those who are involved in community work. This

conclusion is consistent with the work of other researchers such as Asdourian and Zimmerli, 2018; and Rastegar and Hady (2017), who denied the existence of such a relationship.

Since trust is identified as a component of civic engagement (Dahlgren, 2009), and there is a gap in the literature concerning trust as a sub-variable of civic engagement, it was decided to investigate relationship between the independent variables and the mediator, knowledge sharing, using the Pearson correlation. The value of 0.523** shows a positive and strong correlation between knowledge sharing and trust. This is consistent with the finding of Rastegar and Hady (2017) that the 'higher [is] the trust in or perception of value of social media culture that is characterized by AI, [the] lower will be the disengagement of participants from civic engagement'. In addition, the same research indicates that knowledge sharing is an important variable that enables the transfer or sharing of knowledge about social capital and mediates between social capital and organizational performance. Asdourian and Zimmerli (2018) stated that there is a direct relationship between knowledge as a construct and civic engagement. Nevertheless, this research has not shown that knowledge sharing is correlated with components of civic engagement.

Similarly, knowledge sharing has a strong and positive correlation (0.503**) with values as a component of civic engagement. In the work of Rastegar and Hady (2017), knowledge sharing is described as a set of behaviors that lead to exchanging information or sustaining other people. This is consistent with the results above, as the two are found to be components of civic engagement. This is consistent with the evidence of Norris (2001), Barber (1999) and Etzioni (1993).

The findings above where H4, indicate that knowledge sharing plays a mediating role between social capital and civic engagement, and that the relationship between civic engagement and social capital is a significant and positive one, even in the absence of

knowledge sharing after the experiment. This shows that 'The impact of social capital on civic engagement is significantly and positively mediated by knowledge sharing'.

6.2.1.6 Assessing the relationship between civic engagement and trust

The relationship between civic engagement and trust is found to be positive and strong, as the Pearson correlation is 0.615**. The regression analysis model also shows that the relationship was significant and positive, both before (0.009) and after (0.00) the experiment. There is prior evidence for this relationship in the work of Richard and Gogg (2005), who showed that trust is one of the most significant means by which civic engagement gains effectiveness and significance. Other researchers show that trust in the media, both traditional and digital, is a major source of effective civic engagement. Trust in digital platforms (social media) and the internet in general is particularly important, as these are open, transparent and neutral means of communication. If social media is not trusted, civic engagement is not expected to be effective (Glanville & Paxton., 2015).

6.2.1.7 Assessing the relationship between civic engagement and values

The relationship between civic engagement and value is found to be a positive and strong one, as the Pearson correlation is 0.667**. The regression analysis model showed that the relationship was significant and positive after the experiment (0.00), having been positive and insignificant before it (0.374). This is consistent with the results of Chow and Chan, who related values to the social context and civic engagement, and identified the six most important: service, social justice, dignity and worth of the individual, the importance of human relationships, integrity and competence.

6.2.2 The relationship between social and civic engagement and the mediating role of knowledge before and after the experiment

The data before and after the ChatBot experiment show that there is a significant difference between the two results, as the p-value is 0.007. There is no evidence from previous research

to explain this difference. This seems to be an addition the present research, filling the gap identified.

6.3 Addressing the research problem

The thesis was intended to assess the mediating role played by knowledge sharing between social capital and civic engagement in the context of AI. It was shown in the previous section that the relationship between social capital and civic engagement is positive and significant, as demonstrated by the values from the data analysis. The presence and absence of knowledge sharing caused this difference, showing that social capital is directly associated with civic engagement. When the relationship was tested indirectly, it was observed that knowledge sharing made the relationship stronger and more significant. The present research has assessed the effect of social capital through the perspective of social media. The empirical evidence resulting from the data analysis produced the finding that, in the context of AI, social media represented by social capital can facilitate the process of sharing knowledge between people in the Kingdom of Bahrain, thus facilitating civic engagement activities in the Bahraini community.

The research solved one of the problems identified in the literature review, that little of the existing research had identified the positive role played by knowledge sharing in constructing an effective relationship between social capital represented by AI-based social media and civic engagement. Some existing research such as Wen and Wei (2018), which is often referred to in the present thesis, fails to indicate the role played by knowledge sharing, as it focuses on the association between social media and civic engagement. This shows clearly that there is a gap in the literature about the relationship between social media and civic engagement. This means existing models do not foresee the possibility of participant disengagement, which could be a serious threat to civic engagement activities. This has been

recognized by the researcher as a gap in the literature, and has been dealt with in its theoretical framework. This is a success for this thesis.

6.4 Critical evaluation of the applied research approach

The applied methodology of the present research can be critiqued assessing the research approach, strategy and choice.

(1) Assessing the research approach First, when the researcher decided to conduct the present research, the existing and available literature about the thesis topic and related methodology were reviewed. At this stage, the researcher knew he wished to achieve. It was most important then to find the existing gap in literature, make a conceptual framework and form the hypotheses. This directly led to the formulation of the conceptual framework (Creswell, 2002), which helped the researcher to recognize that the research could be carried out using the deductive research method, in which the development of theory leads to the hypotheses and not vice versa. The researcher did not choose the inductive approach, which implies that the available literature is scarce while the topic itself is new, and requires data collection and analysis to develop the theory (Sanders, Lewis & Thornhill, 2009). Sanders, Lewis and Thornhill (2009) also showed that it is essential to apply the deductive approach rather than the inductive, especially when time is short, as the deductive approach entails lower risk. The present thesis took three years to be completed, which meant that the inductive approach could have been riskier and more time-consuming for the researcher, as there was no guarantee that a theory would emerge from the collected data.

(2) Assessing the research strategy, the selection of the current thesis research strategy was prompted by the formulated research questions (Sanders, Lewis & Thornhill, 2009). The present thesis uses two ‘what’ questions, and thus an adapted survey. The nature and purpose of the research implied an experimental approach. Experimental research is defined as “the research type that is regularly applied in social and scientific research in which researchers are

keen on recognizing the cause and effect relationship between the research variables"(Nielsen, 2011). This is in line with the researcher's intention to investigate the mediating role of knowledge sharing in the relationship between social capital and civic engagement, before and after a ChatBot experiment.

(3) **Assessing the choice** This thesis implements a mono method, which is a type of quantitative research. Because of this, a survey was employed as a single data collection technique, to collect numerical data. However, triangulation might have been a better choice of method for this thesis. In triangulation, a mixture of qualitative and quantitative research methods is applied, so that interviews could have been combined with the questionnaire. Using a mixture of data collection is likely to lead to more verified results. Greater confidence in the results is likely, as the outcomes of the quantitative and qualitative method are reached in parallel. Ultimately, this could make the conclusions of the research more reliable.

6.5. The new research framework after change:

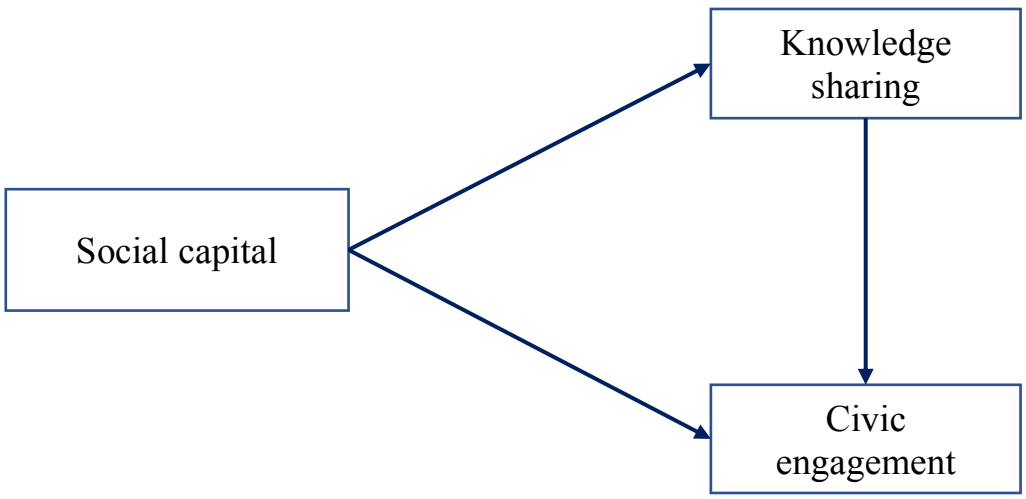


Figure 6.1 The new research framework after change

It is worth noting that this figure shows the relationship between all the research variables. The independents (Social capital) proved to have a significant relationship with the mediator variable knowledge sharing (.12). The mediator variable knowledge sharing has a significant relationship with the dependent variable civic engagement (.42). In the absence of knowledge sharing the independent variables (social capital) have a significant relationship with the dependent variable civic engagement (.61).

6.5. Summary

The key objective of this chapter has been to assess the empirical evidence gained through the data analysis, by comparing it to the theories critiqued in the literature review, which has been supplemented by further comparisons and assessments. This was intended to explain whether and why the theories were supported by the empirical findings. Furthermore, it was also explained how the research has partly filled the gap in research identified in the literature review.

Chapter Seven: Conclusion

7.1. Introduction

Chapter 6 compared the findings to the existing research in the literature review and determined which were supported by it. This presented the major differences with the literature review in the light of the researcher's hypotheses. This chapter concludes the research, as follows.

Section 7.2 contains an overview of the research, and a summary of the aims and outcomes of each chapter of the thesis. Section 7.3 explains how the research achieved these aims and objectives. Finally, Section 7.4 presents the findings and contributions to research.

7.2 Research review

The thesis began in Chapter 1 by describing the research problem. The choice of research problem was prompted by the available published literature, focusing on the relationship between social capital and civic engagement. This research problem stated that civic engagement is not currently at expected levels, even though methods of communication and marketing, persuading individuals to participate, are rising in quantity and quality on a daily basis. In the context of AI, it is expected that communication between individuals through many networks should be faster and better. However, there seem to be problems with the knowledge being shared about civic engagement, especially where young people are concerned. Research showed that the literature which addresses the relationship between social capital and civic engagement, with the mediating role of knowledge sharing in the context of AI, needs further improvement and support. More work is needed in this area, as there is little literature which currently focuses on it. This is the theoretical problem, as stated in the current research. It is therefore important to assess the relationship between social capital and civic engagement in the context of AI in the absence and presence of knowledge sharing. The shortage of empirical findings about this thesis with knowledge sharing as a mediator variable is noticeable and must be addressed. The research has also considered bonding capital and

bridging capital as the main components of social capital. Social media was used to represent social capital as characterized by AI. Civic engagement was investigated in the light of trust and values, as components of civic engagement. This thesis commenced with a careful and in-depth review of the available related literature, with priority given to journal articles.

To achieve the aims and objectives of the present thesis, Chapter 2 provided a critiqued literature review, to systematically analyze this literature and make the following statements:

(1) The role of social capital theory in understanding how bridging and bonding social media characterized by AI influences civic engagement is not well addressed in the literature.

(2) Social capital theory models are the most widely used in research related to knowledge sharing and social behavior.

(3) A combination of social capital and social exchange theories needs to be used, in order to understand how knowledge sharing is influenced by social media.

(4) There are always challenges in sharing knowledge about social capital, and people will always either accept, reject or be confused about whether social capital influences knowledge sharing.

(5) Civic engagement can be supported by knowledge sharing. It is clear that knowledge drives civic engagement. Knowledge sharing is also related to civic engagement; in this relationship knowledge sharing affects civic engagement as a variable that mediates between social capital and civic engagement.

(6) The existing theories do not explain the relationship between culture and civic engagement in an environment where civic engagement is affected by social media, social capital and culture in the context of AI.

Chapter 3 enabled the researcher to achieve another objective of this thesis: the development of the conceptual framework and hypotheses. This objective was fulfilled by conducting an in-depth critique of the relevant theory, so that the research problem was

identified. The conceptual framework was established in accordance with six hypotheses. This framework describes the relationship between social capital, knowledge sharing and civic engagement, both directly and indirectly. However, the literature review used civic engagement theory and social exchange theory, among others, as well as social capital theory.

Chapter 4 enabled the researcher to fulfil another objective of the research. This chapter presented the research methodology by indicating the research approach, methodology and design. The stance of this research is positivist and the research employs a quantitative method.

The adopted research strategy and experimental research design both fit the philosophy of positivism and the quantitative method. An online survey was conducted online, using Google Sheets (GS). The decisions made by the researcher in Chapter 4 were all justified. In accordance with the similarities between this thesis and previous research, the researcher selected methods used in the four core studies from which the survey instrument for this research was adapted. The deductive research approach, through which the development of theory leads to hypotheses, was then applied. The choice of research strategy was driven by the formulated research question. As a result, the thesis made use of two 'what' questions, and an adapted survey.

Chapter 5 described the process of data analysis and its results. It first presented the demographic data of the research sample, then provided the descriptive statistics for the research variables. This was followed by the Pearson correlation test, and finally the six hypotheses were assessed using the regression tests.

Chapter 6 presented the causes and consequences of the empirical findings, in accordance with the empirical findings outlined in Chapter Five.

Chapter 7 will then suggest future research that could take place as a result of the empirical findings of this thesis.

7.3 Meeting the aim and objectives of this thesis

Chapter 1 presented the aim and objectives of the thesis, in order to establish a route map to help answer the research questions of the thesis.

Aim: To contribute to an understanding of the relationship between social capital and civic engagement, in the absence and presence of knowledge sharing.

Objectives

The following objectives were achieved:

1. To study the concepts of social capital, knowledge sharing and civic engagement, and their representations through the literature review and its relationship with civic engagement.
2. To identify the relationship between social capital and civic engagement by studying the relevant concepts, models and theories.
3. To develop the theoretical framework and an appropriate methodology to answer the research questions set for this research.
4. To formulate the required hypotheses and verify those hypotheses in order to answer the research questions and assess whether the aim and objectives have been achieved.

Research questions

RQ1: *To what extent are bonding and bridging social capital associated with social media?*

RQ2: *To what extent can knowledge sharing mediate the relationship between social capital and civic engagement?*

RQ3*: To what extent is social capital in terms of trust associated with civic engagement?*

RQ4*: To what extent is social capital in terms of values associated with civic engagement?*

The first objective, as presented in the Chapter 2 was to critically review the available literature about social capital, social media, knowledge sharing and civic engagement in the context of AI. The aim of the literature review was to understand the associations between the research variables, while also identifying the gaps in the literature in order to assess how those gaps could be narrowed.

The second objective was presented in Chapter 5. It was to assess and critically evaluate the relationship between social capital and civic engagement. This was achieved through the empirical findings.

The third objective was to develop the theoretical framework and an appropriate methodology to answer the research questions set for this research. The fourth objective was to formulate the required hypotheses and verify them, to answer the research questions and assess whether the aim and objectives have been achieved. Both objectives were achieved in Chapter 3.

7.4 Main findings and contributions of this thesis

The ultimate findings of this research led the researcher to various contributions that are based on the contextual information introduced in Chapters 1, 2 and 3. Chapter 4 outlined the applied research methodology. Chapter 5 presented the data analysis process and the empirical findings, which were then discussed in Chapter 6.

Findings 1, 2, 3 and 4

These derive from the literature review, and are used to identify the research gap and the initial conceptual framework.

Finding 1 Social capital theory indicates that the two most significant components of social capital are bridging capital and social bonding. In the context of AI, social media is a perfect representative of social capital, as it has many effects on the processes of engagement in the community.

Finding 2 The models of social capital theory are broadly employed in research related to knowledge sharing and social behavior. However, a combination of social capital and social exchange theories should be used to better recognize the integration of knowledge sharing and social media.

Finding 3 Many different challenges exist when relating social capital to sharing knowledge. Similarly, the correlation between civic engagement and knowledge sharing needs further assessment through empirical research.

Finding 4 The theories in the available related literature are not sufficient to understand the relationship between social capital and civic engagement, in the presence and absence of knowledge sharing, in an environment characterized by AI.

Contribution 1 from Findings 1, 2, 3 and 4

Considering the findings outlined above, result to an integrated conceptual framework that was presented in Chapter 3.

This framework produced, six hypotheses were formulated. These were all intended to assess the relationship between bonding capital, bridging capital and social capital; the relationship between social capital theory and civic engagement; the impact of knowledge sharing as a mediating variable between social capital and civic engagement; and the relationship between trust and values and civic engagement. The mediating role of knowledge sharing between social capital and civic engagement was a major issue of this thesis, as the existing research did not correlate the two independent and dependent variables in the presence of this mediator variable.

Finding 5 The relationship between social capital and knowledge was shown to be significant and positive. The values of the Pearson correlation and the simple regression conducted in Chapter 5 demonstrated that social capital is significantly and positively

associated with knowledge sharing in the Kingdom of Bahrain. They also showed that bonding capital and bridging capital are both associated with knowledge sharing.

Contribution 2 from Finding 5

The thesis presents empirical evidence for the relationship between social capital (bonding-bridging) and knowledge sharing. This area has not been widely investigated. The correlation between the two categories of social capital has not been empirically evidenced and correlated to knowledge sharing. This is therefore an important contribution which helps to narrow this gap in the literature.

Finding 6 It is concluded that knowledge sharing is significantly and positively associated with civic engagement. The relationship between the two variables shows that knowledge sharing, as a mediator variable, plays an effective role in supporting the practices and activities of civic engagement in an environment characterized by artificial intelligence. Knowledge sharing is recognized to make a significant and positive contribution to trust in social media and values of social media, as components of civic engagement.

Contribution 3 from Finding 6

The relationships between knowledge sharing and civic engagement, and between knowledge sharing and trust and values, indicate a conceptual framework which adds to the existing body of literature in this knowledge domain.

Finding 7 In the presence of knowledge sharing, social capital is significantly and positively associated with civic engagement in the context of AI in the Kingdom of Bahrain.

Contribution 4 from Finding 7

The empirical evidence for the association between social capital and civic engagement adds further value, and contributes to solving the research problem, especially as it suggests that this association exists in the presence of knowledge sharing.

7.5 Research achievements

This thesis has so far given the individual research findings and contributions of the researcher.

However, from a holistic perspective, it also aims to assess the mediating role played by knowledge sharing between social capital and civic engagement in the context of AI. To achieve this aim, the researcher used the empirical assessment method recommended by many previous studies. Many techniques were used to analyze the collected data. They were chosen because these previous studies have used them to test the conceptual framework. The necessary statistical tests enabled the researcher to test the six hypotheses. This showed, most importantly, that:

- The impact of social capital on civic engagement is significantly and positively mediated by knowledge sharing.
- The impact of social capital on civic engagement is significantly and positively mediated by knowledge sharing.

This represents a contribution to the literature about this knowledge domain.

7.6. Research implications

In addition to the theoretical implications described in Chapter 6, the findings have further practical implications. It is understood that knowledge sharing facilitates the process of associating social capital and civic engagement, and generates positive and significant effects for social capital on civic engagement. Universities will be able to use these findings to encourage their students to take part in civic engagement, especially using AI-based social media in the context of AI (Wen and Wei ,2018).

Universities will also require the knowledge management infrastructure provided through the IT infrastructure in order to support tacit knowledge mobilization (Frid, 2000) For universities and all educational bodies, knowledge is central and knowledge sharing is highly

significant. Some challenges clearly indicate the need for further research about knowledge sharing and its practical implications for different sectors.

The findings of the research are also applicable for the civic engagement sector in the Kingdom of Bahrain, and they will contribute to maintaining participation in this domain, because they show how social media can lead to greater participation through the benefits of knowledge sharing.

There is also a need to identify precise mechanisms through which participation can be increased. Greater incentives are required for users who are students or citizens, so that knowledge is generated and supportive. These mechanisms will need to be increased so that participation also increases.

7.7 Research limitations

The empirical outcomes of the present thesis are likely to be generalized only for users of social media. There is no clear evidence whether they can be generalized for other individuals in different groups.

The present research has empirically investigated the mediating role played by knowledge sharing between social capital and civic engagement . It did not investigate the moderating role of knowledge sharing, as that was not a requirement of the research questions. The research could have been affected by self-selection bias, as the sample size was calculated according to the number of universities in Bahrain, although it is applicable for the countries which are similar to Bahrain in the education, economic, social or geographical context.

The data collection was carried out during a particular time period, so that it was cross-sectional.

7.8 Recommendations for future research

Future research is required that can correlate social capital and leadership in the government and private sectors in the Kingdom of Bahrain.

- An assessment should be made of the relationship between knowledge sharing and quality of performance in different types of organization in Bahrain.
- Factors which could improve the quality of civic engagement in Bahrain could also be assessed.
- Future research could be conducted to assess the relationship between social media and civic engagement under the moderation of knowledge sharing.
- Future research could be conducted to assess the relationship between cultural conditions and civic engagement in Bahrain.
- Future research could be conducted to assess the relationship between social capital and sustainable development in Bahrain.

References

Abbott, M. & Reilly, A., 2019. The Role of Social Capital in Supporting Economic Mobility. *Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services, Office of Human Services Policy,* 42(2), p. 33.

Ahmed, A. . A.-A., 2019. *Online Social Capital Among Social Networking Sites' Users.* 1 ed. Cairo: Abu Dhabi University, UAE & Cairo University, Egypt.

Al-Ansari, H., Gerwe, O. & Razzaque, A., 2020. *Impact of Artificial Intelligence Based Social Capital on Civic Engagement in an Environment of Changing Technology: Development of a Theoretical Framework,* s.l.: Proceedings of the Industrial Revolution & Business Management: 11th Annual PwR Doctoral Symposium (PWRDS) 2020.

Beņķis, J., 2019. NEW TRENDS IN SOCIAL MEDIA. *NATO Strategic Communications Centre of Excellence.*

Benshoten, V., 2001. Civic engagement for people of all ages through national service Unpublished manuscript.

Bhandari, H. & Yasunobu, K., 2009. What Is Social Capital? A Comprehensive Review of the Concept. *Asian Journal of Social Science,* 37(3), pp. 480-510.

Cho, A., Byrne, J. & Pelter, Z., 2020. *Digital civic engagement by young people,* s.l.: UNICEF Office of Global Insight and Policy..

Cubric, M., 2020. *Drivers, barriers and social considerations for AI adoption in business and management: A tertiary study,* s.l.: Technology in Society, Vol. 62.

Ehrlich, T., 2000. Preface, *Civic Responsibility and Higher Education.* 1 ed. s.l.: Oryx Press, (p.vi.).

Hagerty, A. & Rubinov, I., 2020. *Global AI Ethics: A Review of the Social Impacts and Ethical Implications of Artificial Intelligence,* s.l.: s.n.

Handfield, R., Jeong, S. & Choi, T., 2017. *Emerging procurement technology: data analytics and cognitive analytics,* s.l.: Emerald Insight.

Huang, M.-H., Whang, T. & Xuchuan, L., 2017. The Internet, Social Capital, and Civic Engagement in Asia. *Social Indicators Research An International and Interdisciplinary Journal for Quality-of-Life Measurement,* 132(2).

Law, S. P. & Chang, M., 2012. *Social Capital and Knowledge Sharing in Online Communities: A Mediation Model,* s.l.: 45th Hawaii International Conference on System Sciences, Maui, HI, 2012, pp. 3530-3539,.

Manogaran, G., Qudrat-Ullah, H. & Xi, Q., 2020. *The Impact of Artificial Intelligence on Knowledge Management (KM) and Business Strategic Planning (BSP),* s.l.: Knowledge Management Research & Practice, Vol. 18, Issue 3.

Menkhoff, T., Chay, W. W. & Evers, D. H., 2007. Social Capital and Knowledge Sharing in Knowledge-Based Organizations: An. *International Journal of Knowledge Management,* pp. 5-6.

Salinas, L., Thorpe, A., Prendiville, A. & Rhodes, S., 2018. *Civic engagement as participation in designingfor services,* London : London College of Communication.

Scales , P. C., Boat, A. & Pekel, K., 2020. *Defining and Measuring Social Capital for Young People,* s.l.: SEARCH INSTITUTE.

Smith, A., Phillipson, C. & Scharf, T., 2002. Social Capital: Concepts, measures and the implications for urban communities. *KEELE UNIVERSITY- Centre for Social Gerontology,* p. 5.

Valmorbida, A., 2014. Factors affecting participation: the challenges and opportunities in Eastern Partnership countries. *The European Association for Local Democracy.*

Vuori, V. & Okkonen, J., 2012a. Knowledge Sharing Motivational Factors Of Using An Intra-Organizational Social Media Platform.. *Journal Of Knowledge Management,* Vol. 16, pp. 592-603.

Singh, R., 2018. The Bond Between Artificial Intelligence and Knowledge Management. *https://curatti.com/artificial-intelligence-knowledge-management/.*

Abott, R., 2018. The Reasonable Computer: Disrupting the Paradigm of Tort Liability. *Geo. Wash. L. Rev.,* 2018(1).

Abraham, I. & MacDonald, K., 2011. *Encyclopedia Of Nursing Research: Quasi-Experimental Research.*. Springer Publishing Company: s.n.

Acaps, 2012. *Qualitative and Quantitative Research Techniques for Humanitarian Needs Assessment An Introductory Brief,* s.l.: ACAPS.

Adler, R. P. & Goggin, J., 2005. What do we mean by "civic engagement"?. *Journal of Transformative Education,* 3(3), pp. 236–253.

Adler, P. S. & Kwon, S. W., 1999. Social Capital: The Good, the Bad, and the Ugly. *a paper presented in the 1999 Academy of Management Meeting at Chicago.*.

Agrawal, A., Gans, J. & Goldfarb, A., 2018. *Exploring the Impact of Artificial Intelligence: Prediction Versus Judgment,* s.l.: Rotman School of Management Working .

Ahmad, F. & Widén, G., 2018. "Knowledge sharing and language diversity in organisations: influence of code switching and convergence". *European Journal of International Management,* 12(4), pp. 351-373.

Allen, M., 2017. *Quantitative Research.* s.l.: The SAGE Encyclopedia of Communication Research Methods.

Aparna, V. & Ramachandran, K. K., 2019. Reconnoitring Artificial Intelligence in Knowledge Management. *International Journal of Innovative Technology and Exploring Engineering (IJITEE),* 8(7), pp. 2278-3075.

Aslam, H., Shahzad, K., Syed, A. & Ramish, A., 2014. *Social Capital and Knowledge Sharing as Determinants of Academic Performance,* Pakistan: Journal of Behavioral and Applied Management .

Babbie, E. R., 2010. *The Practice of Social Research.* s.l.:Cengage Learning.

Balakrishnan, V. & Gan, C. L., 2016. Students' learning styles and their effects on the use of social media technology for learning. *Telematics and Informatics,* 33(3), pp. 808-821.

Baum, J. & Haveman, H., 2020. Editors' Comments: The Future of Organizational Theory. *Academy of Management Review ,* 45(2).

Behringer, N. & Sassenberg, K., 2015. Introducing social media for knowledge management: Determinants of employees' intentions to adopt new tools. *Computers in Human Behavior,* 48(2), pp. 290-296.

Berraies, S., Lajili, R. & Chtioui, R., 2020. *Social capital, employees' well-being and knowledge sharing: does enterprise social networks use matter? Case of Tunisian knowledge-intensive firms,* s.l.: Journal of Intellectual Capital, Vol. 21 No. 6, pp. 115.

Bilgihan, A., Barreda, A., Okumus, F. & Nusair, K., 2016. Consumer perception of knowledge-sharing in travel-related. *Online Social Networks. Tourism management,* 52(2), pp. 287-296.

Bill & Melinda Gates Foundation, 2020. *2020, Feb. 5 Strategic review: Equitable Futures social capital strategy,* s.l.: Seattle: Author. PowerPoint.

Bircham-Connolly, H., Corner, J. & Bowden, S., 2005. An empirical study of the impact of questionstructure on receipient attitude during knowledge sharing. *Electronic Journal of Knowledge Management,,* 32(1), p. 1–10.

Bolino, M. C., Turnley, W. H. & Bloodgood, J. M., 2002. Citizenship behavior and the creation of social capital in organizations. *Academy of Management Review,* 27(4), pp. 505-522.

Bonnefon, J.-F., Shariff, A. & Rahwan, I., 2016. The social dilemma of autonomous vehicles.. *Science https://doi.org/10.1126/science.aaf2654,* 352(6293), pp. 1573–1576.

Booth, J. M. & Shaw, D. S., 2020. *Relations among perceptions of neighbourhood cohesion and control and parental monitoring across adolescence.,* s.l.: Journal of Youth and Adolescence, 49, 74-86..

Boukes, M., 2019. Social network sites and acquiring current affairs knowledge: The impact of Twitter and Facebook usage on learning about the news. *Journal of Information Technology & Politics. 16 (1),* pp. 36–51.

Bourdieu, P., 1986. The forms of capital. In J. Richardson. *Handbook of theory and research for the sociology of education,* Volume New York: Greenwood, pp. 241–258.

Boyd, D., 2008. *Digital handshakes in networked publics: Why politicians must interact, not broadcast. In B. Rigby (Ed.),,* s.l.: Mobilizing generation 2.0. San Francisco: Jossey-Bass..

Bradeško, L. & Mladenić, D., 2017. A Survey of Chabot Systems through a Loebner Prize Competition. *Artificial Intelligence laboratory, Jozef Stefan Institute, Ljubljana Slovenia.*

Brandtzæg, P. B., Lüders, M. & Skjetne, J. H., 2017. Too many Facebook "friends"? Content sharing and sociability versus the need for privacy in social network sites. *International Journal of Human-Computer Interaction,* 26(11), pp. 1006-1030..

Broussard, M., 2018. Artificial unintelligence: how computers misunderstand the world. *MIT Press, Cambridge.*

Brown, M., Setren, E. & Topa, G., 2016. Do informal referrals lead to better matches? Evidence from a firm's employee referral system. *Journal of Labor Economics,* 34(1), pp. 161–209.

Buckner, J. C., 1988. The Development of an Instrument to Measure Neighborhood Cohesion.. *American Journal of Community Psychology,* 16(6), pp. 771-791.

Burke, M., Kraut, R. & Marlow, C., 2011. Social capital on facebook: Differentiating uses and users. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. *ACM: New York, NY, USA,* 21(2), pp. 571–580.

Burt, R. S., 1992. Structural Holes,. *Cambridge: Harvard University Press,* 21(2), p. 44.

Busalim, A. H., 2016. Understanding social commerce: A systematic literature review and directions for further research. *International Journal of Information Management,* 36(6), pp. 1075-1088.

Castells, M., 2013. *Networks of Outrage and Hope: Social Movements in the Internet Age.* 1st ed. Malden, MA: Polity Press..

Castrounis, A., 2017. Artificial Intelligence, Deep Learning, and Neural Networks, Explained. *[online] Kdnuggets.com. Available at: http://www.kdnuggets.com/2016/10/artificial-intelligence-deep-learning-neural- networks-explained.html.*

Centobelli, P. & Ndou, V., 2019. *Managing customer knowledge through the use of big data analytics in tourism research,* s.l.: Current Issues in Tourism, 22:15, pp. 1862-1882,.

Chahal, K. G., 2009. *Information Systems evaluation in the public sector..* Brunel University Research Archive (BURA). (AAT http://bura.brunel.ac.uk/handle/2438/4711).: s.n.

Chang, H. H. & Chuang, S.-S., 2011. Social capital and individual motivations on knowledge sharing: Participant involvement as a moderator.. *Information & Management, 48(1),* pp. 9-18.

Checkoway, B. & Aldana, A., 2013. Four forms of youth civic engagement for diverse democracy. *Children and Youth Services Review,* 35(11), pp. 1894–1899.

Chong, C. W., Yuen, Y. Y. & Gan, G. C., 2014. Knowledge sharing of academic staff: A comparison between private and public universities in Malaysia. *Library Review, 63(3), 203–223. doi:10.1108/LR 08-2013-0109.*

Chow, W. S. & Chan, L. S., 2008. Social network, social trust and shared goals in organizational knowledge sharing. *Information & Management,* 45(7), pp. 458-465.

Christensen, H., 2011. Political activities on the Internet: Slacktivism or political participation by other means? *, http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/3336,* 16(2).

Chua, A., 2002. The influence of social interaction on knowledge creation.. *Journal of Intellectual Capital,* 3(4), pp. 375-392.

Cohen, J., 1988. *Statistical Power Analysis for the Behavioral Sciences.* 2nd ed. Hillsdale, New Jersey: Lawrence Erlbaum Associates. .

Cohen, L. & Maldonado, A., 2007. Research Methods In Education. *British Journal of Educational Studies,* 4(9), p. 55.

Coleman, J. S., 1988. Social Capital in the Creation of Human Capital. *American Journal of Sociology,* 94(2), pp. 95-121.

Collins, H., 2010. *Creative Research: The Theory and Practice of Research for the Creative Industries".* s.l.: AVA Publications.

Creswell, J., 2014. *Research design : qualitative, quantitative, and mixed methods approaches (4th ed.).* Thousand Oaks: SAGE Publications..

Creswell, J. W., 2002. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* Lnodon, UK: Sage Publications Ltd.

Crowder, J. & Friess, S., 2013. Artificial Psychology: The Psychology of AI.. *Systemics, Cybernetics and Informatics,* 11(8), pp. 1690-4524.

Crowley, D., 2011. Summary of youth engagement strategy.. *Woburn, MA: Social Capital, Inc.,* 13(2), p. 55.

Dahlgren, P., 2009. *Media and Political Engagement.* 1st ed. Cambridge: Cambridge University Press.

Davies, T. & Chandler , R., 2012. Online Deliberation Design. Oxford University Press*,* 21(4), p. 66.

Dee, J. & Leisyte, L., 2017. Knowledge sharing and organizational change in higher education. The. *The Learning Organization,* 24(5), pp. 355–365.

Dekker, R. & Bekkers, V., 2015. The contingency of governments' responsiveness to the virtual public sphere: A systematic literature review and meta-synthesis. *Government Information Quarterly,* 32(4), pp. 496-505.

Diamantopoulos, A. & Siguaw, J. A., 2000. *Introducing LISREL,* London: Sage Publications Ltd.

Diller, E. C., 2001. Citizens in service: The challenge of delivering civic engagement training to national service programs. *Washington, DC: Corporation for National and Community Service,* p. 21.

Edelman, L. F., Bresnen, M., Newell, S., Scarbrough, H., & Swan, J. (2004). The benefits and pitfalls of social capital: Empirical evidence from two organizations in the United Kingdom. British Journal of Management, 15(S1), 59-69.

Eidizadeh, R., Salehzadeh, R. & Esfahani, A. C., 2017. Analysing the role of business intelligence, knowledge sharing and organisational innovation on gaining competitive advantage. *Journal of Workplace Learning,* 29(4), pp. 50–267.

Ekman, J. & Amnå, E., 2012. Political participation and civic engagement: towards a new typology. *Human Affairs. 22 (3),* pp. 283–300.

Ellison, N., Steinfield, C. & Lampe, C., 2010. *Connection strategies: Relationship information and maintenance on social network sites.,* s.l.: Paper presented at the annual meeting of the International Communication Association, Chicago, IL.

Ellison, N. B., Steinfield, C. & Lampe, C., 2017. The benefits of Facebook "friends:" Social capital and college students' use of online social network sites. *J. Comput. Commun,* Vol. 12, pp. 1143–1168.

Fafchamps, M., 2006. Development and social capital. *Journal of Development Studies,* 42(7), pp. 1180–1198.

Field, J., 2003. Social Capital. *New York: Routledge,* 21(2), p. 66.

Filieri, R., 2010. Overcoming knowledge sharing barriers through communities of practice. *Cambridge Scholars Publishing.*

Filo, K., Lock, D. & Karg, A., 2015. Sport and social media research: A review. *Sport management review,* 18(2), pp. 166-181.

Fukuyama, F., 1995. *Trust: The Social Virtues and the Creation of Prosperity*. N.Y.:Free Press, 42(2), p. 10.

Gamio, L., 2020. *Workers most at risk are on the front lines.,* s.l.: (2020, March 18), New York Times, B5.

Gannon, B. & Roberts, J., 2020. *Social capital: exploring the theory and empirical divide,* s.l.: Empirical Economics, VL- 58.

Gibson, C., 2000. From inspiration to participation: A review of perspectives on youth civic engagement." *New York: Carnegie Corporation of New York,* 23(2), p. 17.

Gosman, R. & Botchwey, N., 2013. *Community Engagement: Challenges and tools from the planner's perspective, Applied Research Paper, School of City & Regional Planning,* Georgia: Georgia Institute of Technology.

Greve, A., Benassi, M. & Sti, A. D., 2010. Exploring the contributions of human and social capital to productivity. *International Review of Sociology,* 20(1), pp. 35–58.

Gulati, P., 2009. *Research Management: Fundamental and Applied Research,*. s.l.: Global India Publications.

Gunarto, H., 2019. *Parametric & Nonparametric Data Analysis for Social Research.* s.l.: IBM SPSS. LAP Academic Publishing.

Gupta, S. & Kim, H., 2007. Developing the Commitment to Virtual Community: the Balanced Effects of Cognition and Affects. *Information Resources Management Journal, 20(1),* pp. 28-45.

Habeeb, A., 2017. *Introduction to Artificial Intelligence.* University of Mansoura, Egypt.

Haller, C., 2018. Micro-participation - Sharing Feedback More Easily. *Planning News,* 37(8), pp. 9-10.

Hanifan, L. J., 1916. The Rural School Community Centre. *Annals of American Academy of Political and Social Science,* Vol. 67, p. 130.

Harbour, C., 2016. *Civic Engagement and Cosmopolitan Leadership. In Civic Learning and Democratic Engagement (51–59).* Estados Unidos: Wiley Periodicals, Inc..

Hawkins, R. L. & Maurer, K., 2010. Bonding, Bridging and Linking: How Social Capital Operated in New Orleans following Hurricane Katrina. *British Journal of Social Work,* 40(2), pp. 1777–1793.

Hitlin, S., 2009. Values as the core of personal identity: Drawing links between two theories of self. *Social Psychology Quarterly,* Vol. 66, pp. 118–137.

Inaba, Y. & Togawa, K., 2020. *Social capital in the creation of AI perception,* s.l.: Pringer Link.

Inkinen, H., 2016. Review of empirical research on knowledge management practices and firm performance. *Journal of Knowledge Management,* 20(2), pp. 230–257.

Ishizuka, M., 2017. *Introduction*. In: The Japan Society for Artificial Intelligence (ed). *Encyclopedia of Artificial Intelligence*. Tokyo: Kyoritsu Shuppan, pp. 2–4.

Jabareen, Y., 2009. Building a Conceptual Framework: Philosophy, Definitions, and Procedure.. *International Journal of Qualitative Methods, 8(4),* pp. 49-62.

Jallow, H., Renukappa, S. & Suresh, S., 2020. *Knowledge management and artificial intelligence (AI). 21st European Conference on Knowledge Management, 3rd–4th December 2020,* s.l.: Coventry University.

Jans, E. & Karp, D., 2017. *Digital technologies, The Spirit of Place and active citizenship at the Museum of Australian Democracy,* s.l.: http://openarchive.icomos.org.

Jarrahi, M. H., 2017. Social Media, Social Capital, and Knowledge Sharing in an Enterprise. *University of North Carolina, Chapel Hill, School of Information and Library Sciences 200 Manning Hall Chapel Hill, NC 27599 USA.*

Jones, T. & Taylor, S. F., 2012. Service loyalty: accounting for social capital. *Journal of Services Marketing,* 26(1), pp. 60-75.

Jordan, M. I. & Mitchell, T. M., 2015. Machine learning: Trends,perspectives, and prospects. *Science Management ,* 349 (6245), pp. 255-260.

Kadushin, C., 2004. Too Much Investment in Social Capital. *Social Networks,* 26(2), pp. 75-90.

Kang, M. & Lee, M. J., 2017. Absorptive capacity, knowledge sharing, and innovative behaviour of R&D employees. *Technology Analysis & Strategic Management Journal,* 29(2), pp. 219–232.

Katz, L. F. & Krueger, A. B., 2016. The rise and nature of alternative work arrangements in the United States. *Social Science Research,* 38(2), pp. 266–278.

Khalil, O. E. & Shea, K. T., 2012. Knowledge sharing barriers and effectiveness at a higher education institution. *International Journal of Knowledge Management,* 8(2), pp. 43–64.

Khaliq, E. A., 2014. The Role of Social Capital and Knowledge Management in the Performance of SMEs: An Empirical Investigation in Pakistan. *American Academic & Scholarly Research Journal.*

Kim, Y., Hsu, S. & Zúñiga, H., 2013. Influence of social media use on discussion network heterogeneity and civic engagement: the moderating role of personality traits. *J Commun,* 63(3), pp. 498–516.

Kim, S., Kang, H. & Kim, J., 2011. A sexual health care attitude scale for nurses: Development and psychometric evaluation. *International Journal of Nursing Studies, 48(12),* pp. 1522–1532.

Koohang, A., Paliszkiewicz, J. & Goluchowski, J., 2017. The Impact of leadership on trust, knowledge management and organizational performance:A research model. *Industrial Management & Data Systems,117 (3),* pp. 521-537.

Kuo, F., Tseng, F., CIC, L. & WH, T., 2013. Critical success factors for motivating and sustaining women's ICT learning. *Comput. Educ. ,* Vol. 67, pp. 208–218.

Lam, H. K., Yeung, A. C. & Cheng, T. E., 2016. The impact of firms' social media initiatives on operational efficiency and innovativeness. *Journal of Operations Management,* 47(48), pp. 28-43.

Lang, J. C., 2004. Social context and social capital as enablers of knowledge integration. *Journal of Knowledge Management,* 8(3), pp. 89-105.

Lavrakas, P., 2008. *Purposive Sample,* s.l.: Encyclopedia of Survey Research Methods.

Lee, J., Jones, P., Mineyama, Y. & Zang, X., 2002. Cultural Differences in Responses to a Likert Scale. *Research in Nursing & Health,* 25, pp. 295-306.

Lee, J., 2018. The Effects of Knowledge Sharing on Individual Creativity in Higher Education Institutions: Socio-Technical View. *Administration Science,* 8(21).

Lepenioti, K., Bousdekis, A., Apostolou, D. & Mentzas, G., 2020. Prescriptive analytics: Literature review and research challenges. *International Journal of Information Management,* Vol. 50, pp. 57-70.

Levine, P., 2007. The future of civic engagement: Developing the next generation of American citizens. *Medford, MA: Tufts University Press,* 11(2), p. 33.

Lilleoere, A. & Hansen, E., 2011. Knowledge-sharing enablers and barriers in pharmaceutical research and development. *Journal of Knowledge Management,,* 15(1), pp. 53–70.

Lin, H. F., 2007. "Knowledge sharing and firm innovation capability: An empirical study". *International Journal of Manpower,* 28(4), pp. 315-332.

Lin, N., 2001. *Building a network theory of social capital. In Lin, N., Cook, K., & Burt, R. (Eds.), Social capital theory and research* s.l., pp. 3-30: New Brunswick, NJ:.

Lin, N., 2001. Social Capital: A Theory of Social Structure and Action. Cambridge: *Cambridge University Press,* pp. 24-25.

Lin, N. (2008). A network theory of social capital. The handbook of social capital, 50(1), 69.

Li, Y., Wang, X., Lin, X. & Hajli, M., 2016. Seeking and sharing health information on social media: A net valence model and cross-cultural comparison. *Technological Forecasting and Social Change.*

Lochner, K., Kawachi, I. & Kennedy, B. P., 1999. Social capital: a guide to its measurement.. *Health and Place,* Vol. 3, pp. 259-270.

Maccurtain, S. et al., 2018. Top team trust, knowledge sharing and innovation.. *Link Working Paper Series WP 05-08.*.

Marwick, A. E. & Boyd, D., 2011. I tweet honestly, I tweet passionately: Twitter users, context collapse, and the imagined audience. *New Media Soc.,* 13(1), pp. 114–133.

McCallum, S. & O'Connell, D., 2009. Social capital and leadership development: building stronger leadership through enhanced relational skills. *Leadership & Organization Development Journal,* 30(2), pp. 152-166.

McCombes, S., 2020. *Descriptive research.* [Online]
Available at: https://www.scribbr.com
[Accessed 1 May 2020].

Michailova, S. & Minbaeva, D., 2012. "Organizational values and knowledge sharing in multinational corporations: The Danisco case". *International Business Review,* 21(4), pp. 59-70.

Mladenović, D., Krajina, A. & Kucharska , W., 2018. *Social Media and Knowledge Sharing – What Do We Know So Far?,* s.l.: Research Gate.

Nahapiet, J. & Ghoshal, S., 1998. Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review,* 23(2), pp. 242-266.

Nazim, M. & Mukherjee, B., 2016. Knowledge Management. *Knowledge Management in Libraries.*

OECD , 2001. The well-being of nations: the role of human and social capital, Paris: OECD.

OECD , 2020. *The Impact of Big Data and Artificial Intelligence (AI) in the Insurance Sector,* s.l.: s.n.

Okazaki, S., Andreu, L. & Campo, S., 2017. Knowledge Sharing Among Tourists Via Social Media: A Comparison Between Facebook And Tripadvisor. *International Journal Of Tourism Research,* Vol. 19, pp. 107-119.

Oorschot, V., Arts, W. & Gelissen, J., 2006. Social Capital in Europe. Measurement and Social and Regional Distribution of a Multifaceted Phenomenon". *Acta Sociologica: Journal of the Nordic Sociological Association: Special Issue on Social Capital,* 49(2), pp. 149−166.

Oostervink, N., Agterberg, M. & Huysman, M., 2016. Knowledge Sharing On Enterprise Social Media: Practices To Cope With Institutional Complexity. *Journal Of Computer-Mediated Communication,* 21, pp. 156-176.

Orf, D., 2016. The 8 best chatbots of 2016. *https://venturebeat.com/2016/12/21/8-top-chatbots-of-2016/.*

Osatuyi, B., 2013. Information sharing on social media sites. *Computers in Human Behavior,* 29(6), pp. 2622-2631.

Park, S., Kong, L. & Artino, J., 2020. The Positivism Paradigm of Research.. *Academic Medicine,* 95(5), pp. 690-694.

Pate , D. J., 2016. The color of debt: An examination of social networks, sanctions, and child support enforcement policy. *Race and Social Problems,* 8(1), pp. 116–135.

Perce, M., Ozer, M. & Hojnik, J., 2019. Social and juristic challenges of artificial intelligence. *Palgrave Commun,* 5(61).

Portela, M., Neira, I. & Salinas, M. d. M., 2012. Social Capital and Subjective Wellbeing in Europe: A New Approach on Social Capital. *Social Indicators Research,* 114(2), pp. 493–511 .

Posavac, E. & Carey, R., 1997. *Program evaluation: Methods and case studies.* 5th ed. s.l.: Prentice-Hall, Inc.

Putnam, R., 1993. *Making Democracy Work,* s.l.: Princeton University Press.

Putnam, R. D., 1993. Making Democracy Work: Civic Traditions in Modern Italy, Princeton, N.J.. *Princeton University Press,* p. 167.

Putnam, R. D., 2000. Bowling alone: The collapse and revival of American community. *New York: Simon & Schuster.*

Raj, M. & Seamans, R., 2019. Primer on artificial intelligence and robotics. *Journal of Organization Design,* 8(11), pp. 2-4.

Regoniel, P., 2012. *How to Make a Conceptual Framework.*. [Online]
Available at: http://college-college-life.knoji.com/how-to-make-a-conceptual-framework/
[Accessed 10 March 2020].

Richard, P. & Gogg, A., 2005. What Do We Mean By "Civic Engagement"?. *Journal of Transformative Education,* 3(3), pp. 236-253.

Rich, E. & Knight, K., 1991. Artificial Intelligence. *McGraw-Hill Education.*

Robison, L. J., Schmid, A. A. & Siles, M. E., 2002. "Is Social Capital Really Capital?". *Review of Social Economy,* 60(1), p. 1−21.

Ross, S. & Morrison, G., 2003. Experimental Research Method. *Research Gate Journal,* pp. 1021-1043.

Rowlands, A. & Tan, N. T., 2014. Social redevelopment following the Indian Ocean tsunami: An international social work response through the FAST Project. *Social Development Issues,* 30(1), pp. 47-58.

Saffer, A.J., 2016. A message-focused measurement of the communication dimension of social capital: Revealing shared meaning in a network of relationships. Journal of Public Relations Research, 28(3-4), pp.170-192.

Saleem, M., Sumbal, E. T. & Eric, W., 2017. Interrelationship between big data and knowledge management: an exploratory study in the oil and gas sector*,* s.l.: *Journal of Knowledge Management* Vol. 21 No. 1.

Samad, S., 2020. Achieving innovative firm performance through human capital and the effect of social capital, s.l.: *Management & Marketing. Challenges for the Knowledge Society* Vol.15: 2.

Sampson, R. J., Raudenbush, S. W. & Earls, F., 1997. Neighborhoods and violent crime: a multilevel study of collective efficacy. *Science,* Vol. 227, pp. 918-924.

Santos, F. R., Bragagnolo, G., Oliveira, M. & Chaves, S. M., 2020. *Exploring knowledge management within teams from a social capital perspective: a literature review,* s.l.: Gest. Prod. vol.27 no.2.

Scales, P. C. et al., 2020. *Effects of developmental relationships on middle-school students' motivation and performance.,* s.l.: Psychology in the Schools. Doi.org/10.1002/pits.22350.

Schuler, D., 2019. How civic intelligence can teach what it means to be a citizen. *The Conversation.*

Schuurman, F. J., 2003. Social Capital: the politico-emancipatory potential of a disputed concept, *Third World Quarterly,* 24(6), pp. 991-1010.

Shaikh, M., Bhutto, N. & Maitlo, Q., 2012. (2012), Facets of job satisfaction and its association with performance, *International Journal of Business and Social Science,* 3(7) *,* pp. 322-327.

Shirkey, C., 2011. The political power of social media: Technology, the public sphere, and political change. *Foreign Relations,* 90(1), pp. 28-41.

Singh, N. & Koiri, P., 2016. Understanding Social Capital. *Social Science Spectrum,* 2(4), pp. 275-280.

Smith, S. S., 2016. Job finding among the poor: Do social ties matter? In D. Brady & L. M. Burton (Eds.). *The Oxford Handbook of the Social Science of Poverty* Oxford, UK: Oxford University Press*,* p. 438–461.

Sommerfeldt, E., 2012. Networks of social capital: Extending a public relations model of civil society in Peru. *Public Relations Review, 39,* pp. 1-12.

Sousa, M. J., Pesqueria, A. M. & Lemos, C., 2019. *Decision-Making based on Big Data Analytics for People Management in Healthcare Organizations,* s.l.: Journal of Medical Systems 43: 290.

Sparks, S. D., 2020. *Students' "dream jobs" don't match new economy.,* s.l.: Education Week, Feb. 12.

Stromback, J. and Kiousis, S. eds., 2011. Political public relations: principles and applications. Taylor & Francis.

Taherdoost, H., 2016. Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. *SSRN Electronic Journal ,* 5(3), pp. 28-36.

Tanimoto, J., 2018. Evolutionary Games with Sociophysics: Analysis of Traffic Flow and Epidemics Evolutionary Economics and Social Complexity Science. *Springer, Singapore, https://www.springer.com/la/book/9789811327681.*

Thackery, R. & Hunter, M., 2010. Empowering Youth: Use of Technology in Advocacy to Affect Social Change. *Journal of Computer-Mediated Communication,* 15(4), pp. 575- 591.

Third, A., Conrad, D., Moody, L. & McDonald, K., 2020. *Digital Media and Adolescent Engagement for Social and Behavioural Change: A Rapid Evidence Review,* s.l.: UNICEF/Western Sydney University.

Togawa, K. & Inaba, Y., 2020. Social capital in the creation of AI perception. *Journal of Korean Statististical Science,* pp. 1-2.

Trochim, W., 2002. *The research methods knowledge base.* New York: Atomic Dog Publications.

Tsirogianni, S., 2011. Social values and the creative ethos in the Greek knowledge society: A phenomenological analysis. *World Futures.,* Vol. 67, pp. 155–181.

Tsirogianni, S. & Gaskell, G., 2011. The role of plurality and context in social values.. *Journal for the Theory of Social Behaviour,* Vol. 41, p.p 441–465.

Uldam, J., 2014. *Corporate management of visibility and the fantasy of the post-political: Social media and surveillance, New Media and Society, doi: 10.1177/1461444814541526.*. s.l.:s.n.

Uphoff, N. & Wijayaratna, C. M., 2000. Demonstrated Benefits from Social Capital: The Productivity of Farmer Organizations in Gal Oya, Sri Lanka. *World Development,* 28(2), pp. 1875−1890.

Uslaner, E., 2002. *The Moral Foundations of Trust.* Cambridge: Cambridge University Press.

Valenzuela, S., Park, N. & Kee, K. F., 2009. Is There Social Capital in a Social Network Site?: Facebook Use and College Students' Life Satisfaction, Trust, and Participation. *Journal of Computer-Mediated Communication,* 14(4), pp. 875–901.

Verba, S., Lehman, S. & Brady, H., 1995. *Voice and Equality: Civic Voluntarism in American Politics.* Cambridge, MA: Harvard University Press.

Wasko, M. L. & Faraj, S., 2005. Why should I share? Examining social capital and knowledge contribution in electronic networks of practice. *MIS quarterly,* 29(1), pp. 35-57.

Weber, H. H., Kessel, M., Budych, K. & Schultz, C., 2011. Shared communication processes within healthcare teams for rare diseases and their influence on healthcare professionals' innovative behavior and patient satisfaction. *Implementation Science,* 40(6), p. 32.

Wen & Wei, 2018. Social Capital and Knowledge Integration in an ERP Project Team: The Importance of Bridging AND Bonding. *British Journal of Management,* Vol. 15, pp. 43–57.

Westlund, W., 2006. *Social capital in the knowledge economy: Theory and empirics.* 1st ed. Berlin: Springer.

Widén-Wulff, G. & Ginman, M., 2004. Explaining knowledge sharing in organizations through the dimensions of social capital. *Journal of Information Science,* 30(5), pp. 448-458.

Wilde, A. C., 2000. *Political Capital: Bowling to Win.* Thesis, Manchester: Institute for Development Policy and Management, University of Manchester, p. 18.

Woolcock, M., 1998. Social Capital and Economic Development: Toward a Theoretical Synthesis and Policy Framework. *Theory and Society,* 27(2), pp. 151-208.

Yang, K., 2007. Individual Social Capital and Its Measurement in Social Surveys. *Survey Research Methods,* 1(1), pp. 19−27.

Yates, D. & Paquette, S., 2011. Emergency knowledge management and social media technologies: A case study of the 2010 Haitian earthquake. *International Journal of Information Management,* 31(1), pp. 6-13.

Yeo, R. & Dopson, S., 2017. Lose it to Gain it! Unlearning by Individuals and Relearning as a Team. *Organizational Learning in Asia.*

Yeşil, S. & Hırlak, B., 2018. Exploring Knowledge-Sharing Barriers and Their Implications. *Advances in Knowledge Acquisition, Transfer, and Management (AKATM).*

Zhong, Z., 2014. Civic engagement among educated Chinese youth: the role of SNS (social networking services) bonding and bridging social capital. *Comput. Educ.,* Vol. 75, pp. 263–273.

Appendices

Appendix 1 Letter to Participants, Questionnaire and Conditional Letter of Approval

Dear Sir or Madam,

I am a research student pursuing my PhD in Brunel University London, UK. My research applies to the areas of artificial intelligence based social capital, knowledge sharing and civic engagement. The title of my research is "Artificial Intelligence Related Drivers of Civic Engagement: Social Capital, Trust and Values, and the Mediating Role of Knowledge Sharing". The investigations aim to reveal how changes in technology affect civic engagement in the modern world by gaining knowledge on whether introduction of latest technologies like artificial intelligence in social media could lead to civic engagement or disengagement thus fill a research gap found in the literature.

As part of the investigation in need to collect data from different people involved in civic engagement through a survey questionnaire. The survey is self-administered and has been developed using a predefined scale that facilitates easiness in completing the survey.

Since the research aims to gain knowledge on the extent to which AI based social media impacts civic engagement mediated by knowledge sharing, I request you to complete the survey questionnaire after you have participated in a simple civic engagement activity that will be specially organised as part of the research. The civic engagement activity uses chatbot and social media which you have to use and participate in the activity.

I will be very thankful to you if you would participate in the activity and the survey to enable me to complete this important research by sparing a few moments of your valuable time. Your participation is entirely voluntary; it is up to you to decide whether or not to take part. If you decide to take part, you will be given this information sheet to keep and be asked to sign a consent form. After deciding to take part in the event and survey, if you feel that you need to withdraw, you are still free to withdraw at any time and without giving a reason. I assure you that the information provided by you, will only be used for the purpose of this research, and will be treated in strict confidence and your identity will be kept anonymous. I also guarantee you that all the information provided by you will not be allowed to be used by any third party or entity. The study has obtained ethical approval from Brunel University, London, UK.

If you require any clarification, please do not hesitate to contact me on the telephone and/ or e-mail details provided below. Thanking you for your kind cooperation and support for this important study.

Yours sincerely,
Name: Husain Moh'd Alansari
PhD student, Brunel University, UK
Email: husain,alansari@brunel.ac.uk , Mobile: + 973 34449888
Kingdom of Bahrain.

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4 May 2020

CONDITIONAL LETTER OF APPROVAL

APPROVAL HAS BEEN GRANTED FOR THIS STUDY TO BE CARRIED OUT BETWEEN 06/05/2020 AND30/06/2020

Applicant (s): Mr Husain Al-Ansari

Project Title: Impact of artificial intelligence based social media on civic engagement mediated by knowledge sharing

Reference: 20797-LR-May/2020- 25472-4

Dear Mr Husain Al-Ansari

The Research Ethics Committee has considered the above application recently submitted by you.

The Chair, acting under delegated authority has agreed that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that the conditions of approval set out below are followed:

- **Please ensure that you have permission from someone in authority at Ahlia University before you distribute the questionnaire to their students.**
- **On the Participant Information Sheet, please make the following amendments:**
- **"What if something goes wrong?" please add that the participant should contact the Chair of the CBASS Research Office, email-cbass@brunel.ac.uk.**
- **"What will happen to the results of the study?" you should state that they will be used to write up your thesis.**
- **"Who is organising and funding the research?" you should put your name in conjunction with Brunel University.**
- **"What are the indemnity arrangements?" Brunel provides appropriate insurance cover for research which has received ethical approval.**
- **Please add your supervisor's name and Brunel email address to the Contact details.**
- **For Complaints, the email address is cbass-ethics@brunel.ac.uk.**
- **Please ensure that you monitor and adhere to all up-to-date Government health advice for the duration of your project.**
- The agreed protocol must be followed. Any changes to the protocol will require prior approval from the Committee by way of an application for an amendment.

Please note that:

- Research Participant Information Sheets and (where relevant) flyers, posters, and consent forms should include a clear statement that research ethics approval has been obtained from the relevant Research Ethics Committee.
- The Research Participant Information Sheets should include a clear statement that queries should be directed, in the first instance, to the Supervisor (where relevant), or the researcher. Complaints, on the other hand, should be directed, in the first instance, to the Chair of the relevant Research Ethics Committee.
- Approval to proceed with the study is granted subject to receipt by the Committee of satisfactory responses to any conditions that may appear above, in addition to any subsequent changes to the protocol.
- The Research Ethics Committee reserves the right to sample and review documentation, including raw data, relevant to the study.
- You may not undertake any research activity if you are not a registered student of Brunel University or if you cease to become registered, including abeyance or temporary withdrawal. As a deregistered student you would not be insured to undertake research activity. Research activity includes the recruitment of participants, undertaking consent procedures and collection of data. Breach of this requirement constitutes research misconduct and is a disciplinary offence.

Professor David Gallear

Chair of the College of Business, Arts and Social Sciences Research Ethics Committee

Brunel University London

Section I

This section is about general information related to the participant.

1. Gender:

Male	Female

2. Age:

18-25 Yrs.	26-35 Yrs.	36-45 Yrs.	46-55 Yrs.	>55 Yrs.

3. Number of years of experience in volunteering:

18-25 Yrs.	26-35 Yrs.	36-45 Yrs.	46-55 Yrs.	>55 Yrs.

4. Have you used social media for civic engagement activity?

Yes	No

any social activity?

5. Applications based on artificial intelligence are currently available, for instance applications that can respond to general knowledge questions posed verbally. Have you ever used or come across such? applications based on artificial intelligence?

Yes	No

Section II

This section is about social capital that is characterized by AI and is linkable to civic engagement.

Please rate with an "X" each item on the five-point Likert scale shown, to indicate your level of agreement with the statement.

1-Strongly Disagree, 2- Disagree, 3-Neutral, 4-Agree, 5-Strongly agree

Bonding social capital: It is defined as bringing individuals together with others like them (Stout et al. 2012).

Code	Item						Reference
	Bonding social capital means:	1	2	3	4	5	Authors
BOND1	Having people connected through social media engaged in civic activities who can give advice.						Myeong and Seo (2016); Choi et al. (2013); Zhang et al. (2011); Lee (2010); Lee (2008); Onyx and Bullen (2000) [Bond-Bridging-instrument-sustainability-08-00322]
BOND2	First, requesting advice from close people connected through social media and engaged in civic activities.						
BOND3	Considering close people connected through social media engaged in civic activities as a reference group.						
BOND4	Sharing and discussing with close people connected through social media and engaged in civic activities.						
BOND5	Feeling a sense of importance among close people connected through social media and engagement in civic activities.						

Bridging social capital: It indicates bringing together individuals with those who are different from them in terms of race, social class, education, age, religion, gender or ethnicity (Stout et al. 2012).

	Bridging social capital means:	1	2	3	4	5	Authors
BRD1	Believing most people engaged in civic activity connected through social media in our society.						Myeong and Seo (2016); Choi et al. (2013); Zhang et al. (2011); Lee (2010); Lee (2008); Onyx and Bullen (2000) [Bond-Brindg-instrument-sustainability-08-00322]
BRD2	Helping strangers engaged in civic activities through social media.						
BRD3	Engagement in civic activities which will give benefits in the long term.						
BRD4	Inclination to connect to a civic group like societies through social media.						
BRD5	Engagement of civic groups or societies with government in civic matters using social media.						

Social media: Online architecture for producing content, annotating content produced by others, joining networks to share or view content (e.g., Facebook, Twitter, Instagram) (Tucker et al. 2018) [Excellent-Social-Media-Political-Polarization-and-Political-Disinformation-Literature-Review].
Social media characterized by artificial intelligence: The example used is chat bot. Chatbots.org (2016) is a "humanlike conversational AI," ranging from 'artificial conversational entity' to 'virtual support agent.' [AI-Chatbots-Humbots-and-the-Quest-for-Artificial-General-Intelligence]

	The positive effects of social media characterized by artificial intelligence encourages	1	2	3	4	5	Authors
SM1	discussions on various civic issues amongst online social groups using artificial intelligence.						Jiang and Kontauts (2019) [Social media instrument-1866-7111-1-PB]
SM2	Engagement of people online to participate in civic activities using artificial intelligence.						
SM3	sharing knowledge about events using artificial intelligence.						
SM4	scheduling events using artificial intelligence.						

Knowledge sharing: It is defined as sharing of knowledge on social media (social capital), and is a concept where knowledge sharing, knowledge transfer and knowledge creation occurs (Qi & Leung, 2015; Zaffar & Ghazawneh, 2012) (from theoretical framework).

	The knowledge shared amongst member of social media characterized by AI, participating in civic activities is:	1	2	3	4	5	Authors
KSH1	relevant to the topics.						Chiu et al. (2006) [Knowledge sharing-admsci-08-00021]
KSH2	easy to understand.						
KSH3	Accurate.						
KSH4	Complete.						
KSH5	Reliable.						
KSH6	Timely.						

Civic engagement: Represented by civic action – It is explained as the intentions to become involved in the future in some community service or action (Moely et al. 2002) [Civic Attitudes and Skills Questionnaire (CASQ) scale] [Civic engagement-instrument-mjcsl_2002_1].

	Civic action	1	2	3	4	5	Authors
CE1	I plan to do some volunteer work using social media characterized by AI.						Moely et al. (2002) [Civic engagement-instrument-mjcsl_2002_1]
CE2	I plan to become involved in my community using social media characterized by AI.						
CE3	I plan to participate in a community action program using social media characterized by AI.						
CE4	I plan to become an active member of my community using social media characterized by AI.						
CE5	In the future, I plan to participate in a community service organization using social media characterized by AI.						
CE6	I plan to help others who are in difficulty using social media characterized by AI.						
CE7	I am committed to making a positive difference using social media characterized by AI.						

Trust: It is defined as citizens' generalized trust and reciprocity associated with social capital (social media) and expressed in terms of the level of agreement to the statements given by the participants in civic activities using social media characterized by AI (Stout et al., 2012) [Excellent-trust measurement-124-502-1-PB]. [(E.g. Bridging networks sustain generalized trust and reciprocity (e.g., most of the time people can be trusted) among individuals and communities. Bonding social networks bring individuals together with others like them and sustain particularized, in-group, trust and reciprocity (e.g., trust in the people you actually know and regularly interact with)]

	Please mark against the statements below what you think is the most appropriate response on the level of your agreement about the trust you have in people	1	2	3	4	5	Authors
TR1	Most people can be trusted						Stout et al. (2012) [Excellent-trust measurement-124-502-1-PB] Vinken et al. (2003) [Trust-isppjul2003]
TR2	Can't be too careful						
TR3	People try to be fair						
TR4	People try to take advantage of you						
TR5	People try to be helpful						
TR6	People just look out for themselves						

Please rate with an "X" each item on the five-point Likert scale shown, to indicate your level of your perceived importance with the statement.

1-Low importance, 2- Slightly important, 3-Neutral, 4-Moderately important, 5-Very important

Value: It is defined as values of sharing and giving when citizens offer information from their perceptions and betterment proposals with regard to civic issues.

	Please state your personal perceived importance on the following statements:	1	2	3	4	5	
VA1	Willingness to share, improved practices (civic engagement) using social media characterized by AI.						Asdourian and Zimmerli (2016) [Excellent-factors affecting civic engagement-document]
VA2	Individual distribution of local data, advice and ideas for improvement in real time of civic issues using social media characterized by AI.						
VA3	Retrieving information generated by the citizens about civic issues using social media characterized by AI.						
VA4	Information sharing by organizations related to civic issues using social media characterized by AI.						

Thank you

Appendix 2: Workflow showing application of technical knowledge

Introduction

The concept is to use Artificial Intelligence (AI) as a tool to register candidates and collect their information in a quasi-human manner via a ChatBot, and then to analyze their data and use it to generate reports about gender, age groups etc.

Tools

All the tools used in this project are Cloud-based, apart from the generated reports, which have been produced using Microsoft Excel. The tools used are a ChatBot platform, Google Sheets, an integration tool, a Facebook page, a website and Microsoft Excel.

Methods

A ChatBot platform allows the candidates to register their information, as well as their intention to participate in the civic engagement activity at designated places and designated times. It also sends an automated confirmation to the email address they use during the registration process.

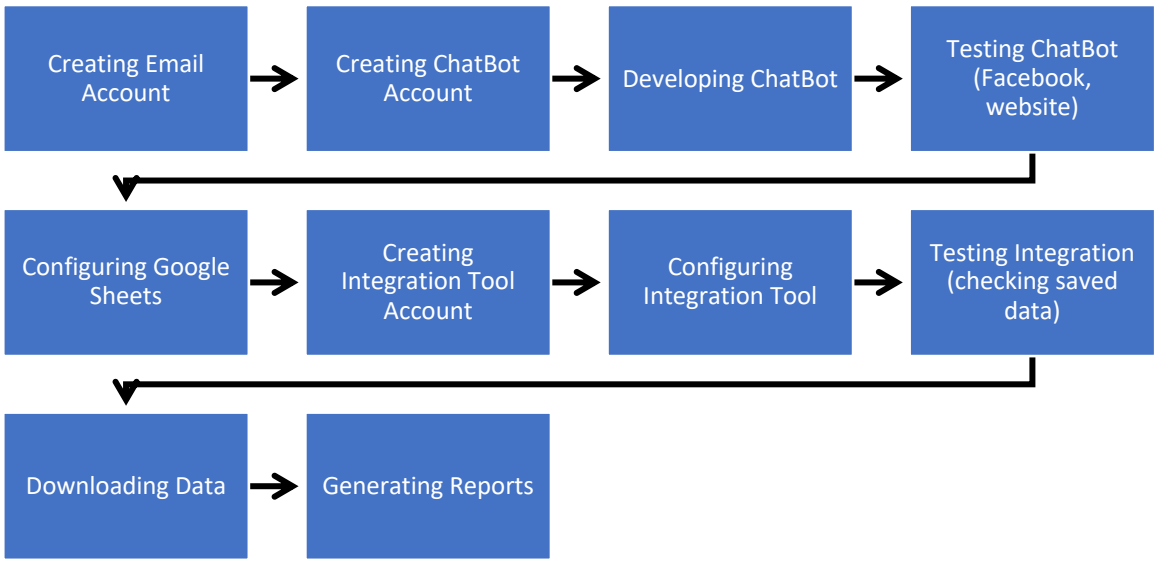
Registration workflow

1. Candidates enter the Facebook page or the website. (A link to the ChatBot can also be directly forwarded to them.)
2. The ChatBot asks candidates about their intention to register. If they refuse, the discussion ends automatically. If they agree, the ChatBot will ask them to fill in their data, to complete the registration process.
3. On successful completion of the process, a confirmation email is sent to them, indicating the location and time for which they are registered.

Development workflow

1. An email account in Gmail.com has been created for this specific purpose. This address will only be used to send the email confirmations and to store the registration information on Google Drive.
2. A ChatBot account is created to receive the registration data.
3. A Facebook page and website host the ChatBot widget.
4. An account is created on an integration platform, to send data to Google Sheets and the email confirmation to candidates.

Development diagram



Data Flow Diagram